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A CRITICAL STUDY OF THE RIGHT MINUS WRONG METHOD

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It is evident that the mental tests now existent must be subjected to thorough critical analysis, both as to content and procedure, before being fully accepted as reliable. Undoubtedly some of these tests are more in need of immediate refinement than others. Among those whose reliability is especially open to question is the test calling for the simple choice between two alternative answers; for example: *"Yes* or *No," "True* or *False," "Same* or *Different,"* etc. This form has come to be quite commonly accepted in group testing, chiefly because of its economical administration, and it may be found prominently used in several group intelligence tests, as well as in some special ability tests and standard tests of school subjects.

It was early recognized that the ordinary method of scoring on the basis of right answers would not serve since the element of chance might enter largely so as to effect the answers. A special method of scoring was, therefore, devised and used, called the "right minus wrong" method. This method assumes that the subject will guess at all answers of which he is not absolutely certain, and that there is an even chance that each answer so guessed may be right or wrong, or that all the guesses will be evenly divided among the rights and wrongs. It further assumes that none of those responses which are not guessed will be wrong. In order to render these assumptions more certain the subject is told to "guess if he is not sure."

Apart from all questions and doubts regarding the psychological basis and the mental effects of introducing guessing into

such a test, it is evident that the assumptions underlying the scoring should be carefully validated to insure the reliability of results for individual measures as well as for group measures.

Two tests were given to a group of college students who cooperated well. About 200 records were made, but some were discarded because they were incomplete or imperfect.

In order to test the validity of the assumption that the "right minus wrong" method of scoring a guess series will give correct individual scores, and to give a vivid picture of how chance actually operates, the subjects were given a nonsense test consisting of a list of numbers from 1 through 50, each followed by a dash. The subjects were asked to place after each number an *S* or a *D* indiscriminately by pure chance, taking care not to make either of them in any order a large number of times.

The papers were then graded by a key, arbitrarily selected, from one of the National Intelligence Test series. Theoretically, the score for each paper should have been 0 and this should have been the score given by the application of the "right minus wrong" method of grading. What actually occurred when this method was used with the nonsense test is shown in the distribution of Table I.

TABLE I. DISTRIBUTION OF 172 COLLEGE STUDENTS IN A PURE CHANCE TEST OF 50 ITEMS WHEN GRADED BY THE RIGHT MINUS WRONG METHOD

Score	Frequency	Score	Frequency
−18	1	2	21
−16	3	4	19
−14	3	6	12
−12	1	8	10
−10	9	10	4
− 8	8	12	7
− 6	8	14	11
− 4	15	16	2
− 2	20	18	0
0	17	20	1

The mean average of this distribution is 1.035, a fair approach to the theoretical zero norm for the group, but there is large individual variation from the mean, with scores ranging

from — 18 to + 20, with an average deviation of 6.232 and a standard deviation of 7.34. With a P. E. of ± 5.27 the chances are even that any one of the subjects picked at random will have a score outside the limits, —4.2 and + 6.3, or within these limits.

In Figure 1 the normal curve is fitted to the distribution so as to show very clearly that it falls, with minor deviations, according to the laws of chance. It is certain that, within the

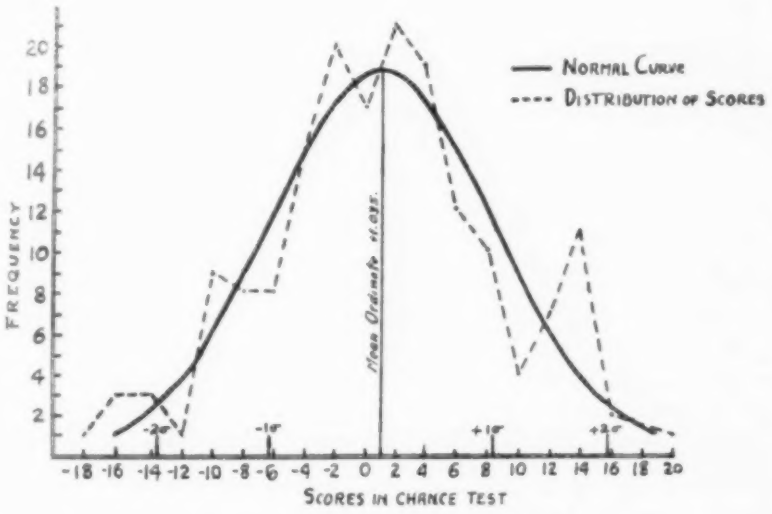

FIGURE 1. DISTRIBUTION OF SCORES MADE BY 172 COLLEGE STUDENTS IN A PURE CHANCE TEST AND COMPARISON WITH THE NORMAL CURVE

limit of 50 trials, chance does not so operate as to divide the items into two equal classes for every individual, or for the major part of a group. The fundamental assumption underlying the "right minus wrong" method of scoring is therefore invalid, and as a consequence the method itself is open to attack in point of reliability.

A simple method of investigation of the "right minus wrong" method as applied to an alternative test was planned as follows:

Twenty-five pairs of synonyms and an equal number of antonyms were collected, mixed, and grouped so as to make a "same-opposite" test. The words selected were sufficiently difficult to insure a large proportion of wrongs, yet definite enough to make clear distinction possible. The subjects were informed of the general nature of the experiment. No time limit was set, each student finishing the test.

The subjects were asked to write on the short line between the paired words either the letter *S* or *D*, according to whether the words were of the same or different meaning, and in addition they were requested to guess where they were not absolutely sure, but to indicate such guesses by a line drawn through the pair of words involved.

The results cannot be here presented in detail for each of the subjects, but whether considered by groups of 10, by sexes, or as a whole the averages are consistent as shown in Table II. Considering the final averages as the data for the group we find that the score according to the "right minus wrong" method (column c) is 21.07. If only the number right had been considered the score would have been 35.56 (column a). But 16.69 items were guessed (column f), hence should receive no credit. Neither should the 7.12 items receive credit which were not guessed, but wrong (column g). This makes a total of 23.81 items registering failure (column h) which, subtracted from the total number attempted, give another and true grade of 26.19 which is 5.12 items higher than the score given by the "right minus wrong" method.

It is noteworthy that in almost every average given more items are guessed right than wrong, indicating probably the existence of a subconscious guide. It is possibly significant, though apart from our problem, that there is a marked sex difference at this point, the women being either more conscientious or more definitely controlled by the subconscious indicator than the men. But granting the assumption—doubtful indeed with the small number of items involved—that there should be as many rights as wrongs among the guesses, we may find the difference between

TABLE II. ANALYSIS OF RESULTS OF VOCABULARY TEST BY AVERAGES FOR GROUPS

Number in Group	Right (a)	Wrong (b)	Right—Wrong (c)	Guessed			Not guessed but wrong (g)	(f)+(g) (h)	(50)−(h) (i)	(i)−(c) (j)
				Right (d)	Wrong (e)	Total (f)				
Men										
10	35.2	14.8	20.4	9.0	5.6	14.6	9.2	23.8	26.2	5.8
10	32.9	17.1	15.8	10.0	10.0	20.0	7.1	27.1	22.9	7.1
10	31.9	18.1	13.8	10.5	10.2	20.7	7.9	28.6	21.4	7.6
10	36.2	13.8	22.4	7.9	6.8	14.7	7.0	21.7	28.3	5.9
10	36.8	13.2	23.6	8.0	7.2	15.2	6.0	21.2	28.8	5.2
10	33.5	16.5	17.0	11.9	9.9	21.8	6.6	28.4	21.6	5.6
10	34.0	16.0	18.0	8.6	7.9	16.5	8.1	24.6	25.4	7.4
10	36.5	13.5	23.0	7.8	7.5	15.3	6.0	21.3	28.7	4.7
10	37.2	12.8	24.4	8.6	6.4	15.0	6.4	21.4	28.6	4.2
10	36.1	13.9	22.2	7.5	7.0	14.5	6.9	21.4	28.6	6.4
Average.....	35.03	14.97	20.06	8.98	7.85	16.83	7.12	23.95	26.15	5.99
Women										
10	33.5	16.5	17.0	8.7	7.3	16.0	9.2	25.2	24.8	7.8
10	38.3	11.7	26.6	8.3	5.3	13.6	6.4	20.0	30.0	3.4
10	36.3	13.7	22.6	12.5	6.8	19.3	6.9	26.2	23.8	1.2
10	34.8	15.2	19.6	11.2	9.3	20.5	5.9	26.4	23.6	4.0
10	38.9	12.1	26.8	9.2	4.7	13.9	7.4	21.3	28.7	1.9
10	35.5	14.5	21.0	9.0	5.9	14.9	8.6	23.5	26.5	5.5
10	36.7	13.3	23.4	9.8	7.3	17.1	6.0	23.1	26.9	3.5
4	36.25	13.75	22.5	9.0	8.0	17.0	5.75	22.75	27.25	4.75
Average.....	36.28	13.85	22.43	9.77	6.73	16.50	7.12	23.62	26.38	3.95
Average for all groups.....	35.56	14.49	21.07	9.32	7.37	16.69	7.12	23.81	26.19	5.12

the two (1.95) and add this to the score (column i) as being rights not due to chance alone. This gives a score of 28.14, or 7.07 points higher than the "right minus wrong" score. In any case it appears conclusively that the "right minus wrong" method of scoring unduly penalized the subjects as a whole. This is largely due to the fact that the subjects make nearly as many errors in the items not guessed as they do in those guessed, and are given double penalty for these errors also, when they should receive single penalty only.

The comparison of the distribution of the two sets of scores as given in Table III and Figure 2, shows clearly the wider spread given by the "right minus wrong" method, and the lower placement in the scale. It is notable that the more exact method

TABLE III. DISTRIBUTION OF COLLEGE STUDENTS IN A VOCABULARY TEST AS GIVEN BY TWO METHODS OF SCORING—RIGHT MINUS WRONG AND TRUE METHOD

Class Interval	Frequency	
	Right—Wrong	True
45—48.9	1	0
41—44.9	3	3
37—40.9	2	5
33—36.9	8	18
29—32.9	13	31
25—28.9	27	35
21—24.9	39	34
17—20.9	24	30
13—16.9	23	14
9—12.9	19	4
5— 8.9	9	0
1— 4.9	5	0
−3— 0.9	0	0
−7— 2.9	1	0
Total.....	174	174

gives results which more nearly approach the form of the normal curve as to distribution. The standard deviation with the "right minus wrong" method is 8.66, or approximately 2 points higher than that of the "true method" which is 6.88.

The coefficient of correlation between the "true" scores and the "right minus wrong" scores was worked out by the Product

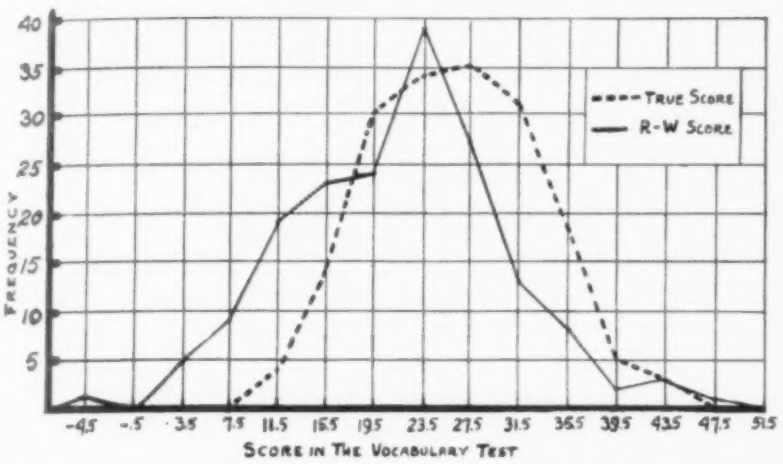

FIGURE 2. COMPARISON OF DISTRIBUTION OF 174 COLLEGE STUDENTS BY THE TRUE METHOD AND THE RIGHT-MINUS-WRONG METHOD OF SCORING A VOCABULARY TEST

Moment Formula and found to be 0.718 ± 0.025. Although this is a high positive correlation it is far from perfect, and the chances are comparatively low that one will be able to predict the score of any individual as obtained by one method from that derived by the other method. The regression of the right-minus-wrong-plus-guessed or true method on the right-minus-wrong method is 0.677 while the regression of the latter on the former is 0.761.

It is when we consider individual deviations, however, that the unreliability of the method becomes most apparent. The difference between the "right minus wrong" score and the true score for each subject was noted. In some instances the score of the former was higher, but in the majority of cases it was lower as is shown in the distribution of deviations in Table IV.

The remarkably large deviations of some of these cases reveals clearly the inadequacy of the "right minus wrong" method of scoring for individual measurement and diagnosis. One subject deserved a score of 25 but, according to the method in question, received a score of 6. Another deserved a score of 11, but

TABLE IV. DISTRIBUTION OF DEVIATIONS OF RIGHT MINUS WRONG SCORES FROM THE TRUE SCORES

Deviations from True Scores	Frequency	Deviation from True Scores	Frequency
−20	1	−4	15
−19	1	−3	12
−18	0	−2	9
−17	2	−1	8
−16	3	0	6
−15	2	1	11
−14	3	2	5
−13	6	3	1
−12	5	4	2
−11	8	5	2
−10	8	6	2
− 9	6	7	0
− 8	11	8	2
− 7	13	9	3
− 6	14	10	1
− 5	12	Total.....	174

received a score of —6. (As a matter of fact one is not permitted to give a score below 0 in the actual usage of the method, although the rule involved appears quite arbitrary). Only 6 or 3.4 percent of the total number made identical scores by the two methods. The average deviation of the data in Table IV is 6.35, the standard deviation is 7.735, and the P. E. is 5.2. Thus it is evident that the chances of any individual making approximately the true score are rather remote, while the chances are even that he will deviate from the true score somewhere within or without the range —10.3 to +0.08. It is indeed true that in a group test given with a definite time limit many would accomplish less work and consequently have a smaller and easier range of answers in which chance might operate, but the probable error would be relatively larger and the variations from the true score would not be eliminated.

This method of scoring should be further investigated from various points of view. It is clear that it is of very doubtful reliability for group testing and especially so for the analysis of individual ability. Now that the method is being used as an aid to classification, and is even being introduced into college classes to take its place in final examinations, it is urgent that its limita-

tions be fully and frankly recognized. Whatever doubts may eventually be held regarding the reliability of this method must carry with them in related degrees doubts regarding the reliability of similar methods of grading tests which use three or more alternatives.

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AGAIN: EDUCATIONAL DETERMINISM

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It is with ardor that I open my educational periodicals nowadays and hasten to see if Bagley or Terman or lesser lights have a contribution upon Democracy and the I. Q. Although what I find is keenly interesting I am, nevertheless, grieved, for I know that my former teacher and my present colleague, each of whom I sincerely respect and highly honor are both "battling for the Lord" and that they ought to be shoulder to shoulder in the fight. I find myself in sympathy with Bagley's belief in democracy and with Terman's insistence upon the reality and consequence of innate and acquired individual differences. Professor Bagley's trust in the outcomes of democracy inspired me when it was my privilege to be a student in his classes, but I did not get my initial concept from him. I have been a Democrat from the days when I threw stones at the young moron who used to call out "rats, cats, and pickled bats are good enough for Democrats, ice cream and sugar plums are good enough for Republicans." I have liked the term and as with vertical and horizontal growth its meaning has broadened in my mind I have liked it more and more.

I do not in any sense concede to Dr. Bagley a more real belief in democracy than I lay claim to and yet, if he means unqualifiedly what his words seem to mean, he may charge me with lack of frankness. He says that he prefers the frankness of Mrs. Cannon in stating that democracy is in question "to any attempt to camouflage the issue with fine spun distinctions between equalities and equities." On the one hand, I fail to see that the recognition of individual differences and, in so far as possible, their allocation to innate and environmental causes bring democracy into question. On the other hand, I am compelled to draw fine distinctions between these two things and also between nature and nurture and the extent to which traits are consequent upon each, in order to provide myself with the basic

concepts demanded by even a very rough understanding of my fellow kind.

It is not my purpose in writing this article to attempt to mediate between two such doughty opponents. It is both safer and more in harmony with my beliefs to take one side. I do hope, however, to point out certain common grounds between Terman and Bagley, to define, at least in part, their differences, and to show that the collective betterment of the common man demands the recognition of individual differences in the educational process.

Where there is so much controversy one should search for a real issue. If it truly exists it lies somewhere in the debris of "oratorical bombshells," "rhapsodic perorations," and "rhetorical achievements." Professor Terman has been so certain that Bagley's sentiment runs away with his reason and Professor Bagley so fearful that his democracy is threatened that neither has discovered and defined the issue.

Such items as can be salvaged from the storm seem to indicate that Bagley and Terman agree: (1) that there are important innate and also important acquired individual differences; (2) that the collective improvement of mankind is the highest purpose of education; and (3) that educational and intelligence tests are valuable instruments if properly used. They disagree: (1) as to the relative importance of innate and acquired differences; (2) as to the best means for bringing about a collective improvement; (3) as to what constitutes a proper use of test scores; and (4) as to the confidence to be placed in test scores.

Though it is possible to say with some certainty that these disagreements hold, it is very difficult to define them more accurately. If in attempting to do so I err in any important respect, it is to be charged to lack of definiteness in expressed points of view or dullness in comprehension upon my part. The task, however, is worth attempting; but since I am consulting neither of the men, the reader must understand that my statements have not been approved by either of them.

Disagreement (1).—Let us define the social value of a person as being a composite of his ability and inclination to render social service, and express the amount of this trait in any individual by the symbol V. In the case of a child we may think of V as potential social value, the actual service to be rendered later, provided the child lives. Preceding any given experience in a person's life he is possessed of a certain amount of achieved intelligence and inclination to render social service. Let us call this A. Following the experience he has the amount already designated V. The amount V differs from A on account of the experience and is due to H, an hereditary cause, and E, an environmental cause wrapt up in the experience. Thus,

$$V=A+pH+qE \qquad (1)$$

or, the accretion in social value due to the experience is

$$(V-A)=pH+qE \qquad (2)$$

In these equations the proportion of this growth due to heredity is p and the proportion due to nurture is q. At birth heredity is dominant so that, $p=1.00$ and $q=0$. With increase in age, q gains in importance and p loses leading to a final adult condition which, according to Bagley, I would expect to be about, $p=.20$ and $q=.80$, and according to Terman, $p=.80$ and $q=.20$. Here then is a very important difference in emphasis. This question can only be settled by very careful measurement, such as Thorndike's Measurements of Twins, incorporating, in addition to measurements of ability, measurements of inclination to render social service.

Disagreement (2).—There are two distinct theories as to the way to bring about the best and most rapid collective improvement. The first is that the youth of the land (barring the feeble minded) should be given a common fundamental education extending throughout the compulsory school attendance period; and that this education should provide, in the matter of language, political, social and scientific history, and democratic foundations and aspirations, a common understanding which will bind our citizenship into a homogeneous nation, dedicated to the increase

of the collective good. The other view is that individuals are born different and grow more and more different every day and that if innately different individuals were warped by processes of education into a common mold it would be at the sacrifice of the greatest talent and to the immediate detriment of the entire group. The proper education for such innately different individuals is a differentiated one in which task is adjusted to talent and social need. I am sure that Bagley inclines toward the first view and Terman towards the second, though I do not believe my statements would completely satisfy either one as descriptive of his position. Professor Bagley affirms a belief in individual treatment under certain conditions, but I have not discovered a delimitation by him of the field in which such practice is warranted. Professor Terman does not deny (and from being a coworker with him upon the Stanford Achievement Test I know he would affirm) the importance of a common culture though I am not aware that he has, in print, emphasized this value or defined its extent. It may be that these two educational authorities are not nearly so far apart upon this matter as one would gather from recent articles. There can be an experimental solution to this question based upon careful measurements of results of different instructional procedures, after the purpose of education has been defined.

Let us define the purpose of education for a single generation to be the raising of the level of social welfare by the increase of the social value of every individual constituting the nation. Let us define the more ultimate purpose of education to be the holding of the gains of previous generations coupled with addition thereto. Personally I cannot conceive of this more ultimate purpose ever being progressively realized without the principles of eugenics operating either with or without conscious social direction. But since the value of the recognition of individual differences does not depend upon so remote a purpose, we may consider the question from the standpoint of a single generation. This is equivalent to considering the means for increasing the social value of each individual, whatever his status.

There can be no doubt that in terms of (potential) social value individuals differ from the day of their birth. Let us examine into this in more detail. Each act in the educative process, whether at home, on the playground, in the church, or at school, is a stimulus reacted to. Thus, an average child of ten presented in school with the following situations would grow as a result by different amounts: (a) a bit of colored glass; (b) a stick of candy; (c) a request for the answer to "7×8"; (d) a book on the economic condition of Europe; (e) a request for the essential features of Kant's philosophy. Whether or not we know enough actually to put our thinking into practice, it is certain that we may think of stimuli as on a scale of merit for social value. Let us assume that the five stimuli mentioned are in the proper order upon such a scale. The stimulus "what are the essential features of Kant's philosophy" is, *per se*, excellent, but as applied to the average 10-year-old it is as futile as a bit of colored glass. Thus the merits of stimuli from low to high as leading to an accretion in social value are, for a person with an assigned achieved ability, first zero, then small, then larger, reaching a mode at some point, then smaller and finally zero again. The precise nature of this curve we of course do not know, but as a reasonable guess and for purposes of further discussion let us assume that the ordinates of a normal curve represent the extent to which successive stimuli "take," i.e., are appreciated by the person of the assigned achieved ability. There is for this person at the moment of life in question a certain stimulus which he attends to most readily. Let us call this his "natural" stimulus and give it the symbol N.

If at a given moment this natural stimulus is "7×8" there is retrogression if the environment is so changed that the person attends to a "stick of candy," or a "bit of colored glass." Thus, stimuli below N in the scale have negative social value and stimuli above positive. Taking E as any stimulus, as earlier defined, $(E - N)$ is a measure of the stimulus in terms of social value for the person and moment in question. Let us call $(E - N) = x$. This is an asset if x is positive and a debit if

negative. This is simply equivalent to saying that if the individual as a matter of outside pressure or instruction attends to less meritorious stimuli than he would attend to of his own inclination it is a retrogressive procedure and the corresponding x is negative, while if he is induced to attend to a stimulus which is more meritorious than N the process is educative and character building. Under the latter circumstances, x is positive. N will change from person to person, and for a given person from time to time, but for a given time and person there is a natural stimulus N such that E's above it are elevating (positive) and E's below it degrading (negative). We may now rewrite equation (2) and introduce the factor given by the ordinates of a normal curve which measures the likelihood of a stimulus taking effect. Remembering the equation of the normal curve, $y = ce^{\frac{-x^2}{2\sigma^2}}$, we have

$$(V - A) = pH + qc \times e^{\frac{-x^2}{2\sigma^2}} \qquad (3)$$

The symbol c stands merely for the numerical constant entering into the equation of the normal curve and need not concern us.

Since we clearly wish to make our instruction the most effective possible we wish to provide such a stimulus, x, as will result in the greatest accretion, i.e., make $(V - A)$ a maximum. The calculus solution is very simple and gives $x = \sigma$. We reach the very important proposition that the environmental stimulus which, measured in terms of the individual's personal abilities and inclinations, is one standard deviation above (in the direction of social value) his natural or passive ability and interest, is the most effective of all stimuli in augmenting his social value. We can, of course, place no certain credence in the exact value of one standard deviation, but that there is a stimulus somewhere and presumably in this general neighborhood, which is the optimum stimulus follows from the argument. It also follows that this stimulus differs with individuals as they differ in the achieved abilities which they bring to the situation. Further, this proposition is independent of the size of q so we may continue the discussion without attempting to reach a decision as

to disagreement (1),—the relative importance of heredity and environment. It suffices for our present purposes to agree that neither p nor q is zero.

The concept that there exists a stimulus which is optimum for the time and person in question in bringing about development is so fraught with educational possibility that we need an experimental method for determining it. Undoubtedly discerning parents and teachers are apt in discovering these optimum stimuli, but even for them it may be of assistance if they will but note the difficulties and merits of the stimuli spontaneously reacted to, under certain environmental conditions, by their charges and thus locate the 84 percentile type of stimulus. With a normal distribution of interest this would be one standard deviation above the natural stimulus and even if the distribution of interest is not normal this stimulus would surely not be far from the optimum. The technique of instruction should be such as to exert a gentle pressure—we might call it a standard (deviation) pressure—in the direction of reaction to meritorious stimuli, and the consequence of such pressure should be a pupil keen, devoted and inspired by contact with parent or teacher.

Without carrying the algebraic notation any further, the reader who has followed thus far will plainly see that no amount of training of a certain constant degree of superiority applied to individuals of different capacities will result in accretions of social value which are the same for the different individuals. The only way to bring those of varying talent to a common level would be to give the dullards the optimum stimuli as judged by their talents, the medium somewhat less than the optimum as judged by theirs, and the bright much less than their optimum. Though we, to a small degree, approach this by neglecting the capable and providing a really appropriate education for the retarded and feeble minded, we nevertheless do not generally serve our country so ill as this. Such a perversion of the idea of democracy is repugnant to one who believes that a child should have a square deal even though he happens to be more socially minded and more capable than the average of his

fellows. Since differences exist at birth and since a common superior training (i.e. one involving superior stimuli) will not level differences in achieved ability, there is no way such levelling can be brought about except by a training progressively inferior as the children are superior. To tax each child to the optimum there should be a progressively superior training as social capacity increases.

In his failure to recognize this Dr. Bagley seems to me not to be a good democrat. Of course, in terms of purpose I do not question his democracy for a moment. I agree that there is national need for a common culture, but that a common method of instruction can bring it about or that this culture can include such gems as the philosophy of Plato, the analyses of Newton, the subtleties of Shakespeare, I do not believe. Professor Bagley states that we are confronted with a big fact, democracy. True; but human nature is a greater fact and should the two be incompatible there is no doubt which will prevail. As a statistician aware of the stability of the mean in a universe of widely scattering elements, I see not only no threat but great value, from the standpoint of progress and evolution, in encouraging variability of the socially valuable sort. Professor Bagley at one time expresses the belief that genius will take care of itself and at another that a superior child raised among pygmies will turn out a moron. I do not see how one can believe both of these, but why believe either? A cool headed view would suggest that the superior child, like every other child, will worry along wherever he finds himself, but will grow the most in grace and virtue when the environment exerts a steady pressure and demand for the best that he can live up to.

Disagreement (3).—The attempt in the last several paragraphs has been to point out principles which serve in answering the question, "what is the best means for bringing about collective improvement." In doing this the answer to the third point, "what is the purpose of intelligence and educational test scores" has been suggested. In brief, their purpose is to discover achieved ability and to assist in determining the type of

stimulus which, for each individual, is the optimum. In the case of the dull and the feeble minded, available measuring devices serve these purposes with surprising excellence and if superior intelligence devotes itself to the measurement and guidance of the average we may expect the creation of equally serviceable instruments for the handling of these problems. We must admit however, that the prospects of a psychologist whose I.Q. is 140, drawing up highly reliable instruments for the guidance in advanced education of children with I.Q.'s of 150 is not very great. As a matter of common sense, teachers and principals should encourage individual initiative in the selection of studies in direct proportion to demonstrated ability. The child will commonly choose poorly, as witness the sporadic programs and spasmodic performances of even the more capable college students, but even so the advisor should refrain from positive advice, not because of a lack of need for it, but because of the lack of the necessary knowledge to be of service. Unfortunately, an advisor of I.Q., 140 will proffer advice with as much assurance to a child of I.Q., 150 as to one of 100 and herein is the occasion for merited ridicule. Ours is a young science and we have much to learn, including a becoming modesty and a certain reserve. I must leave the matter here for I can scarcely more than guess what Professor Bagley considers the legitimate function of tests and measurements.

Disagreement (4).—Here we have reference to the confidence to be placed in test scores. We may conclude that Professor Terman considers the best of our educational and mental measurements to be very valuable supplements to usual procedures, teacher's judgments, school marks, principal's opinions, etc., as a means of determining differences which are important in school situations; and we are not left in doubt as to Professor Bagley's confidence in them for he hails with enthusiasm every attack upon their validity. We may all welcome such of these attacks as betray an understanding of the situation. We readily admit the point of such criticisms as have been made by men in the field—Colvin, Rugg, and Trabue. The real excellence of

this movement is that such criticisms occur. As practiced by the best psychologists, it is "scientific." This means that it forecasts situations; enabling a checking of forecasts with fruition and thus providing a means for discovering errors and determining probable errors.

If the reader will pardon a personal reference, I would say that I believe I have pointed out fully as many shortcomings and inaccuracies in test and measurement procedures as any one of the three men mentioned and I think I should have been included in their good company. Not long ago I asserted,[1] apparently in a manner that has carried conviction, that every measure of grade overlapping in educational- and intelligence-test abilities, and accordingly every estimate made up to that time of the proportion of children improperly classified was in error. Up to that time reporters of test scores were attacking Professor Bagley's democracy in a terrible manner, suggesting that 60, 70, even 80 percent of the children in a grade were improperly classified. Since then these percentages have been about cut in two. I could give several other illustrations, but surely this one is sufficient to show that I am entitled to a place with the critics. These ranks need augmenting. The test movement has secured a popular hold of such a sort as to constitute a guarantee that it will be misused. There can be no doubt about it; but that is no warrant for attacking it upon an issue—that of undermining democracy—of which it is as innocent as a new born babe.

After studying Professor Bagley's view with care it seems to me that according to it a new born babe with exceptional endowment does constitute a threat to democracy. I hope he will disavow this conclusion and join with us in pointing the necessity of a properly differentiated instruction for such a potential menace.

[1] "The measurement of overlapping," *Journal of Educational Psychology*, 10:458-61. November, 1919.

APPLICATION OF THE ANALYSIS AND PROGNOSIS OF TEACHING FUNCTIONS TO PROBLEMS OF TEACHER TRAINING

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Three preceding articles of this series have established tentative levels of intelligence for graduates of typical state normal schools and have illustrated possible methods of procedure in analyzing teaching functions and in using them to predict teaching success. It is the purpose here to discuss briefly certain implications for teacher-training administration which have been suggested as materials and methods have been presented.

THE CRITERION

The basic problem in a teacher-training school is found to be the changing of human material into new forms consisting of different combinations of qualities. This problem must be solved by a determination of the criterion for all teacher-training efforts and by an arrangement of training activities in preparation for this objective. Given student mind coming from secondary activities, the project is to arrange the curriculum so that teacher mind will result, teacher mind operating successfully in the field of elementary instruction.

This criterion must be discovered by means of adequate activity analysis, and it is frankly admitted that this is not done in the study here reported. The only analysis possible with the time and money available was in terms of a checking of the traditionary personal qualities proposed by Elliott,[1] and used by many subsequent investigators. This attempts, of course, under such rubrics as "skill in teaching" and "cooperation," to include in the analysis certain important teaching activities, *what*

[1] Elliott, Edward C. *Outline of tentative scheme for the measurement of teaching efficiency; presented to the Second Annual State Convention of City Superintendents, October 7 and 8, 1910, held under the direction of C. P. Cary.* Madison: State Department of Public Instruction, 1910. 4 pp.

teachers do. But, on the whole, such plans deal first of all with *what teachers are.* Teaching awaits a real determination of its typical activities like that, for example of Burtt[2] in industry. Possibly attempts like that of Burris[3] in his case studies and that of Knight and Franzen[4] in their "trade tests" for elementary teachers come nearer to an activity analysis, but the former is not scored in terms of amount and the latter has not as yet been used in the field of teacher training.

Personnel Checking at Matriculation

Teacher-training administration must be selective at the point of entrance, even though the need for numbers in the elementary field is pressing. Any other attitude is poor business in spite of the fact that large total enrollment figures are gratifying to boards of control and constituencies.

It has been shown that the general level of intelligence among state normal school students is quite equal to that of other student and professional groups.

The distribution, however, discloses the fact that there are many students in normal schools who should not have been admitted to teacher-training privileges. On the basis of Army Group Examination Alpha, with the group of 780 state normal school students in eight cooperating schools who were given these tests, the facts are as follows:

Average median for state normal school seniors (second year) 135.9
Average median for University of Minnesota Freshmen 130.6
Average median for University of Minnesota women (freshmen) 124.9

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[2] Burtt, H. E. "Employment psychology in the rubber industry," *Journal of Applied Psychology,* 4:1-17, March, 1920.

[3] Burris, W. P. "The case method for the study of teaching," *School and Society,* 15:121-30, February 4, 1922.

[4] Knight, Frederic B. *Qualities related to success in teaching.* (Contributions to Education, No. 120) New York: Teachers College, Columbia, 1922. 67 pp.

Increases in scores resulting from growth, selection, or other causes are found to be about five to ten points per year. Some further details are:

Median for cooperating School E	116.5
Median for cooperating School G	148.4
In cooperating School E, about 25 percent of all scores are below	90.0
In cooperating School G, about 25 percent of all scores are below	130.0
About 25 percent of all scores are below	115.0
Lowest score in any cooperating school	45.0
Highest score in any cooperating school	201.0

The median, it is seen, is too rough a measure for administrative purposes. But it is possible to set a minimum level of intelligence for incoming students and to exclude all who fall below it.

It has also been shown that checking in terms of two items besides *intelligence* is very possible at matriculation, namely *physique* and *previous secondary record*. At this time any unit of the future curriculum may be set up as a criterion; and the probable performance of the student in this activity may be predicted within the limits of a standard error. The most important objective is, of course, the ultimate aim of all teacher training efforts, namely teaching success after graduation. Even with the few rough measures available at matriculation, the value of such prediction is considerable. In terms of R, which expresses the relation of the group of three independent variables given above with the criterion (teaching success), the coefficient is found to be about 0.47. This makes the probable error in estimation amount to approximately four points in a total of 38 on the scale used for teaching success.

The relative weights of the three factors used for prognosis at matriculation—(2) *intelligence*, (3) *secondary record*, (7) *physique*[5]—are indicated by the regression coefficients in the equation for School J:

[5] The numbers attached to these items are code numbers. In the fullest application of the author's technique there are seven of them, and they are kept the same under all circumstances. For example, *physique* is always number 7 no matter how many other items are considered.

$$X_1 = 15.517 - .008X_2 + .145X_3 + .253X_7$$

It is worthy of note that, in this group of three factors used to predict the probable score in future teaching success, physique is nearly twice as important as secondary record and that intelligence has practically no weight at all. The coefficient for intelligence is interesting here, but cannot be discussed in detail. The fact is that "intelligence," as measured in this investigation (by means of Army Alpha and the Thorndike Intelligence Test for High School Graduates), takes a relatively unimportant place in comparison with all other correlating factors used. This is in accord with previous studies,[6] and it may be that "teaching intelligence" is not the same as "alpha intelligence." In fact, if it be conceded that human activity exhibits at least three types of intelligence, abstract, social, and mechanical, it is very possible that, since teaching is a social act, we may find in the second the most elements of identity with teaching functions.

When the regression equation above, and a similar one for School F, are used to predict the teaching success of matriculates, the results for five taken at random are as follows:

Student Number		Prediction Score	Actual Success Score	Discrepancy
School F,	61	31.3	35	3.7
	69	30.2	38	7.8
	66	30.1	32	1.9
School J,	66	29.0	31	2.0
	69	29.7	32	2.3

This makes the average discrepancy in prediction at matriculation, for teaching success on the basis of three items of information then available, but 3.5 points. And this is within the standard error, which is four points out of a possible thirty-eight.

[6] (a) Meriam, Junius L. *Normal school education and efficiency in teaching.* New York: Teachers College, Columbia University, 1905. (b) Knight, F. B. "Qualities related to success in elementary school teaching," *Journal of Educational Research*, 5:207-16, March, 1922. (c) Irwin, H. N. *Correlation between success of teachers in service and school courses in professional training courses* (unpublished), Cleveland School of Education, 1921.

Placement in Student Teaching and in the Field

Two very critical points of advancement after matriculation come (a) when the training school is entered for student teaching and (b) when graduation takes place. Although a few more advanced teacher-training institutions recognize the possibility and desirability of conducting the two preparatory activities, knowing and doing, from the moment of matriculation,[7] the usual arrangement is, nevertheless, a more or less complete separation of theoretical work from student teaching, and very often each is confined to separate successive periods of time. That is, student teaching does not begin until the second and last year of residence. This is the plan in the twelve state normal schools cooperating in this study.

Under such circumstances, there are three possible methods of admission to the activities of student teaching, (a) the automatic method, (b) the guess method, and (c) what might be called the continuity method. The first two are not very different except that the first advances the student through traditional course units into professional courses, observation, and student teaching without much constructive thought and planning about importance or sequence among curricular activities, while the second has an ideal more or less vague but fails to define it or to determine changing abilities in young teachers adequately.

In one of the schools studied, the criterion for admission to student teaching was that the student should satisfy the teacher of handwriting as to her standard for skill in a well-known commercial system. This may well be called the guess method. In another, certain requirements in English classes had to be met. In none of the schools—and they are probably typical in this—was found adequate personnel checking to determine real fitness to proceed into student teaching activities.

A third, and it is thought more scientific, method has just been called that of continuity. This may proceed on the basis of a discovery of actual personal qualities and preparatory activi-

[7] Aspinwall, W. B. "Student-teaching at the Worcester State Normal School," *Educational Review*, 63:379-94, May, 1922.

ties, and of real relationships among all observed items. In our investigation these are (2) *intelligence*, (3) *secondary record*, (4) *academic record*, (5) *professional record*, and (7) *physique*. Two criteria are taken for calculation. According to the first, teaching success after graduation (code number 1) is the dependent variable, and the relative weights of the five independent factors are expressed in the following regression equation:

$$X_1 = 28.52 - .011X_2 - .015X_3 - .536X_4 + 1.024X_5 - .036X_7$$

When prediction is tried for a number of individuals selected by chance, the discrepancy between the rating obtained under contract and the score given by the faculty of the training school according to this equation averages but 1.3 student-teaching units.

In the second calculation, student teaching itself is taken as the criterion, and the independent variables are as above. The following equation obtains here:

$$X_6 = 9.068 - .053X_2 + .014X_3 + .382X_4 + .098X_5 + .093X_7$$

When this equation is used and prognosis is tried with a number of chance cases, an average discrepancy of 0.87 of a student-teaching score is found.

But the most important checking of all eventuates in a statement to hiring bodies and administrative and supervisory officers about probable future teaching success. Here a personal history of at least six years is available as a basis for recommendation. By the proper use of this personal history prediction may be made on a level far above that of chance, and should result in more skilful placement than is possible by the usual method—a method which proceeds on the basis of meager and unorganized information about both preparatory units and criteria.

Such a tool for prognosis may best be made, for the present, as the result of a study of relationships in a specific school for use in that school. But eventually cooperative research among teacher-training institutions may produce a generalized equation in which the preparatory scores of any student may be substituted for the purpose of predicting teaching success. The writer

has made a careful study of relationships among teaching functions not only as reported by other investigators but also as obtained in this investigation. He has also been guided by the recognized criteria for such a realm of concomitant variation.[8] Based on these considerations, the following arrangement of modal intercorrelations between the seven variables has been made, to illustrate such a generalized situation as may possibly appear upon actual statistical determination.

	1	2	3	4	5	6
2	.45					
3	.45	.35				
4	.50	.45	.40			
5	.50	.45	.40	.45		
6	.75	.45	.35	.35	.45	
7	.40	.25	.25	.25	.25	.30
Mean	.508	.39	.35	.35	.35	.30

Pearson, whom any student of correlation will willingly follow, gives as the most important criteria for relative size of coefficients (a) that traits must be closely associated with the criterion and (b) but slightly correlated among themselves. The above arrangement meets these conditions. Variable number 1 (teaching success) is the criterion, and the relation of the other variables to it is such that the mean of the coefficients is 0.508. On the other hand, variables 2 to 6 are not so closely related among themselves since the means of their coefficients decrease from 0.508 through 0.39, and 0.35 to 0.30.

When the regression equation is written for this realm of relationship, it becomes

$$x_1 = .023x_2 + .098x_3 + 1.469x_4 + .709x_5 + 3.546x_6 + .247x_7$$

If the sigmas were all equal, the equation would approximate

$$x_1 = .15x_2 + .15x_3 + .26x_4 + .12x_5 + .64x_6 + .18x_7$$

[8] Pearson, K. "On certain errors with regard to multiple correlation occasionally made by those who have not adequately studied this subject." *Biometrika*, 10:181-87, April, 1914.

This gives a very good idea of the probable relative values of the six factors used in estimating teaching success in the ideal situation deduced. Individual prognoses tried with this tool come out very well. When all of the cases in cooperating School A are used, one third of the predictions are so close that the discrepancy between the prediction and the actual rating in teaching success is well within the standard error (2.66).[9] For all of the subjects listed, the median error of estimation is but 0.17 of a teaching success score (maximum 38).

Curriculum Making

Assuming that the criterion is adequately determined in terms of amount by scientific activity analysis in any teacher-training field, the method of partial correlation makes possible the use of objective measurements of teaching functions as independent variables to solve some of the problems of curriculum construction. One such process will be briefly illustrated here, that of determining degrees of emphasis among curricular units. Because of the close relationship to the curriculum on the side of content, five of the factors operating in this realm of influence are used, namely *secondary record, academic record, professional record, student teaching,* and *physique*. Analysis of these variables is effected through the use of (a) coefficients of partial correlation of various orders, (b) coefficients of multiple, or *n*-fold, correlation, and (c) the regression equation.

(a) By the method of partial correlation the relative importance of the five activities in training for teaching success after graduation is inferred through the arrangement and examination of groupings of the eight hundred coefficients of partial correlation available. The effect upon representative correlating groups is noted when certain coefficients are included and omitted successively. The analysis is not carried much beyond the point of adequate illustration, but it is probably carried far enough to say "that there is something in each of the independent

[9] The formula used is, Standard Error $= \sigma_1 (1-R^2)^{\frac{1}{2}}$; and the result is secured by substituting for σ_1 its value 4.67 and for R its value 0.816.

variables which affects to some degree the relationship of the criterion with each remaining variable" and that student teaching and professional marks seem to be of greatest influence in their effect upon teaching success after graduation.

(b) The coefficient of multiple correlation (R) expresses the relationship of the five items of preparation (or of any two, three or four of them) as a group with the criterion, teaching success. Analysis by this method is carried on by comparing changes in the value of the coefficient under different groupings of the items used. Six such groupings have been made, and many more are possible. In each case, the independent variables have been ranked in accordance with their importance in affecting the value of the coefficient of multiple correlation. The final summation results in the following ranking: 1, *student teaching;* 2, *professional record;* 3, *physique;* 4, *academic record;* 5, *secondary record.*

(c) The regression equation is an expression of relationship, such as $a = bc$, in which b and c are, of course the determining factors in getting the value of a. If a is our criterion, teaching success, then c is a particular item of preparation correlated with the criterion, and b is a statement of its importance, or weight, in the equation. Expressions like the second member of the equation, "bc," will of course be repeated as many times as there are items of preparation related to teaching success (here given the notation a). Analysis of these items through the agency of the regression equation is possible by comparing the weights assigned to the items in making a true statement of their bearing upon future performance. On the basis of all data available from the twelve cooperating state normal schools, the weights assigned to the five items in which we are interested result in rankings the same as those determined by the method of multiple correlation except that *physique* and *academic record* change places.

When the results of these three methods of analysis are summarized in a final list, the order of importance is: 1, *student teaching;* 2, *professional record;* 3, *academic record;* 4, *physique;*

5, *secondary record*. It is not contended that this is a final determination as to the value of these five items in the curriculum of teacher-training institutions. The measures upon which the ranking is based are too rough to permit such a conclusion. It is believed, however, that a method of procedure is suggested which is valid and valuable.

If one wishes to put into practice the weights given above to these five preparatory activities, there are at least four types of emphasis which may be given to some or all of them. These are (a) time emphasis, (b) professional emphasis, (c) money emphasis, and (d) administrative emphasis. Time emphasis refers to the distribution of the total of two years among the different training activities. Professional emphasis means a definite recognition of differing professional standards in the training school and among the faculty on the so-called "academic" side. Money emphasis refers to budget making, and administrative emphasis will result in attitudes and concrete regulations in acknowledgment of the ranking discovered.

Directed Growth in the Field

Teacher training to be finally effective must be continuous. It must result in an impetus to professional growth which under proper direction will follow young teachers beyond the point of graduation and function effectively during teaching under contract. That the two years of school training provided results in but a low level of teaching skill has been shown concretely for School A.[10] Some levels of teaching ability found among certain groups of teachers are as follows, the maximum possible rating being 38:

	Median
43 four-year graduates of School C (first year of teaching)	31.0
56 teachers of long experience, Minneapolis elementary schools	30.0

[10] Whitney, F. L. The gap between lesson plan and student-teacher performance in state normal school practice teaching. Educational Administration and Supervision, 7:361-71, October, 1921.

960 two-year graduates of state normal schools (first year of teaching) 29.8
28 teachers of experience in all grades, small Minnesota city 25.4
34 student teachers in the training department for rural teachers, Minneapolis (first year out of high school) 24.0

It is clear that young teachers just graduated need some method of stimulation in order to provide a continuation of growth in teaching skill. It is equally clear that the teacher of experience needs an application of the same influence. Adequately organized extension activities will provide these stimuli, and the methods of this investigation may be applied to the arrangement and administration of such extra mural teacher-training activities. This continuation of teacher training after graduation must, of course, be based upon an intimate knowledge of the field served. It means an analysis of the activities of the young teacher in her working environment. It may result in a statement of the criterion in definite terms of amount and perhaps in a form already suggested for the work of the supervisor.[11]

Summary

Possible uses of materials and methods found in a study of traits of 1200 state normal school graduates in twelve representative schools have been illustrated above in five directions. The ultimate criterion for all teacher training efforts may be determined and expressed as a definite goal. With this objective in view, candidates for admission to teacher-training privileges may be selected economically. This also makes possible advancement through curricular units on a more scientific basis and placement at graduation with a greater probability of success in the field. Relative emphases among curricular activities may be determined. And, finally, the need for continuation of training becomes apparent, and methods for analyzing the work of the teacher under contract are suggested.

[11] Whitney, F. L. Activity analyses of the work of the general supervisor. American School Board Journal, 65:40-42, December, 1922.

NEW THOUGHTS ABOUT THE FEEBLE-MINDED[1]

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PROBLEMS OF THE SPECIAL CLASS

What is the matter with the special class?[2] Is the movement for the special education of the feeble-minded in the public schools progressing or slipping backward? It cannot stand still. In many school systems special education for the feeble-minded is being eliminated from school administration or is being tolerated only under protest. Are the special classes for defectives failing to make the most of their opportunities, or are they being swallowed up in the greater movement for classification and special education for all types of children?

It is perhaps not too much to say that the movement for the special education of the feeble-minded is the tail that has been wagging the educational dog. At first the educational public was interested in the wagging. Now it gives its attention to the whole dog. But shall we remain satisfied with the mere fact of having called attention to the needs and possibilities of special education in the public schools? Should we not rather do our utmost to continue to progress, to stimulate, and to lead? We have not yet learned all the lessons that the feeble-minded can teach us; neither has public education generally gained more than a mere glimpse of the tremendous possibilities of specialized education.

If we are candid, we must recognize that comparatively little real progress has been made in the special class since ten years ago. Perhaps this is because so much progress was made then. Where the special class movement had its former strongholds,

[1] Read before the Special Class Section of the New York State Teachers' Association, Syracuse, N. Y., November 28, 1922.

[2] "Special class" is used throughout this paper in the narrow meaning of "special class for feeble-minded." Let us hope that we shall soon see the development of many sorts of special classes to meet the educational needs of all types of pupils.

we now find skepticism. The school administrator knows that the special classes for the feeble-minded are expensive from the standpoint of per capita cost. He is quite apt to overlook the fundamentally important, yet indirect, benefits which the great mass of school children receive as a result of the segregation of the feeble-minded. Such an administrator looks to the important and direct results rather than to remote and indirect consequences for the justification of expenditures.

We cannot deny that the special education of the feeble-minded is very expensive. The classes are small, the teachers receive special salaries or bonuses, the equipment and materials are costly, and at the end of the year comparatively little material progress can be shown. In New Jersey, for example, where so much was done in this field, this movement has, as we say of the children themselves, "reached a level." But surely we cannot admit that this is its final level. Surely we cannot be so complacent as to be satisfied with past laurels. The movement for special education of other than feeble-minded types promises so much more to the school administrator that we must make every effort to continue to demonstrate the justice of our belief in the special education of the feeble-minded. We must justify or modify our demand for small classes, for specially trained and adequately paid teachers, and for suitable equipment.

Far be it from me to condemn the special class movement or to magnify the shortcomings of the special class. I do not by any means agree with all the criticisms I have been hearing from different quarters. My only desire is to call attention to the recent conceptions in psychology and education which should be modifying both our thinking and our action about the feeble-minded in the public schools.

Since 1917 our ideas regarding the feeble-minded, their proper education, and their ultimate place in society have been boldly questioned by the psychological heretics and the educationally uninitiated. These folk have discovered that many things we have been telling them about the feeble-minded are not very well founded in scientific fact or practical demonstra-

tion. They have looked into our house and found a certain amount of disorder. They have in effect inspected us, surveyed us, and made a report which finds us accepting belief for theory, preconception for fact, and wish for conclusion. That is one of the few benefits that always follow a war. The spirit of dissatisfaction, unrest, and change, engendered by war, lead inevitably to revision of accepted doctrine. Strangers come into the field and are bold enough to flaunt our pet theories in our faces. We can stop our ears and close our eyes and banish them from our plan, or we can listen to their ingenuousness and learn from their ignorance. It has been well said that we learn more from our critics than from our friends. Let us then inquire what is new in the world as it affects our own problems, and how we can reveal our group intelligence by adapting ourselves to these new ideas and conditions.

What is Feeble-Mindedness?

Who is feeble-minded? This question has been asked many times and has as yet received no satisfactory answer. Articles are being written about "the new moron." We hear descriptive terms that are not yet included in our own special vocabulary. But in truth there is no new *moron*. On the contrary, there is a new normal or subnormal. Our mistake has not been so much one of excluding the feeble-minded in our segregation groups, as one of including the normal. Several theories, which we have accepted as laws, have contributed to this error.

If we review the literature on feeble-mindedness, we find certain basic considerations which have not yet been changed, namely, that feeble-mindedness is a condition of social insufficiency; that this insufficiency is the direct result of inferior intelligence; and that this low intelligence is the result of arrested development. In other words, we cannot escape proving three things before we can consider an individual mentally deficient: (1) he must be socially ineffective, and (2) this ineffectiveness must be the result of inferior intelligence, and (3) this inferior intelligence must represent arrested develop-

ment rather than a degenerated state. Feeble-mindedness is not, therefore, mere social misconduct or maladjustment. It is not mere inability to learn at school. It is not mere lack of verbal intelligence. It is not mere emotional disorder. These things may be associated in greater or less degree with feeble-mindedness, but can never be accepted in lieu of the three-fold criterion. The diagnostician must, therefore, be held responsible for showing, first, that the individual suspected of feeble-mindedness is socially incapable rather than unwilling. The social insufficiency must be fundamental rather than superficial. It must not be the fault of unfortunate environment or lack of opportunity. It must be due to innate incapacity for adaptation rather than to mere nonconformity to current social conditions. And in this connection it must be remembered that social insufficiency is relative. Tredgold refers to "the position of life to which he is born"; Binet speaks of "the social rank of his parents"; and both of them insist that this condition is variable as to time, place, and circumstances. Moreover, this condition of social insufficiency is one which obtains after the individual is mature and must, therefore, be determined by prognosis rather than by diagnosis in the case of children.

There has been a tendency in recent years to interpret this social criterion in terms of conduct. Many investigations have so clearly shown the relation of feeble-mindedness to immorality, delinquency, incorrigibility, and crime that these conditions have sometimes been accepted as adequately meeting the social factor in the definition of feeble-mindedness. That this is so will be witnessed by many superintendents of institutions for the feeble-minded.

Mental Age and Feeble-Mindedness

We have said that the social insufficiency must be the result of insufficient intelligence. With the widespread use of the Binet scale and other mental tests there has been a tendency to replace the social standard of feeble-mindedness with a psychological standard. It was found, for example, that practically no

inmates of institutions for the feeble-minded had mental ages above twelve years of age. That this was in part due to the inefficiency of the tests employed was generally ignored. More serious than this error, however, was the conclusion that because the feeble-minded did not test above twelve, therefore all individuals testing below twelve were feeble-minded. This is obviously a logical fallacy. Besides proving the upper limit of intelligence for the feeble-minded, we should also have discovered the lower limit of normality. The absurdity is simply illustrated. When measured by current mental tests very few negroes show mental ages above thirteen or fourteen years. We would not venture to conclude, however, that all persons testing less than fourteen years are negroes. Yet this is precisely what was done for the feeble-minded. Psychological examining in the army, however, showed that about 45 percent of the recruits had mental ages below thirteen years, 25 percent below eleven years and 10 percent below nine and a half years. It would, of course, be absurd to suppose that any such percentage of our population is feeble-minded. Indeed, many recruits with mental ages as low as eight or even seven years were not considered feeble-minded when a complete clinical diagnosis was made. Psychological examining in the army also showed important differences in mentality according to nationality and color, and indicated that individual diagnosis should include such considerations. We cannot, therefore, afford to diagnose feeble-mindedness among adults on the basis of mental age alone. If this is true among adults, where mental development is relatively fixed and certain, how much more so must it be true among children where we are confronted with the problem of prognosis as well as diagnosis.

I. Q. and Feeble-Mindedness

Nor is the matter any easier if we attempt to use the I. Q. in place of the mental age. On the contrary, this adds to our difficulties because it obscures the important fact of the mental age itself by converting it to a ratio. The I. Q. should never be used independently of the actual life age and the mental age for in-

dividual diagnosis. In the case of adults the standard I. Q is the mental age divided by the constant 16. If we divide by this constant, the army results show 35 percent of the recruits with I. Q.'s below 75 and 10 percent below 60; yet by no means all the men with such low I. Q.'s could properly be classed as feeble-minded after a comprehensive diagnosis. In my own individual experience I found some colored and foreign-born recruits with I. Q.'s as low as 50, and occasionally even 45, who were nevertheless not feeble-minded.

If I were a satirist, I should like to write a book entitled, "Simplified Segregation; or Mental Diagnosis Made Easy," and the contents would be a satire on the abuse of mental age and intelligence quotients in relation to feeble-mindedness. In the case of children it has become customary to replace mental age with the I. Q. Now, as you all know, the I. Q. is the ratio obtained by dividing the mental age by the chronological age. This ratio has many advantages in that it converts an absolute measure into a relative measure. The danger comes in comparing these relative measures while disregarding the original figures. This danger is increased by the acceptance, as if they were laws, of many interesting hypotheses regarding the I. Q. If these hypotheses represented something more than wishes, clinical diagnosis would indeed be a simple matter. For example, we are told that the I. Q. is approximately constant on the average, and this is more or less correct. It applies to the average, but not necessarily to the individual case. Yet, clinical psychology is principally concerned with *individual* diagnosis, and segregated classroom groups are made up of selected individuals. Therefore, the conclusion which is true for the average applies only with a certain degree of probability with respect to the individual. Unfortunately, these degrees of probability are too frequently overlooked. If the I. Q. is approximately constant on the average, it is also approximately variable on the average. As a matter of fact, the I. Q. cannot be used as a certain means of predicting progress from year to year except for, at best, fifty percent of the cases.

Adult Mental Age

Another important result contributed by psychological examining in the army bears on the average mental age of adults. There have been numerous assumptions as to the age at which intellectual growth ceases. In discussing this question we must be careful to insist that we are not discussing total mentality, maturity, experience, knowledge, or personality. When we say the growth of intelligence ceases at a particular age we mean intelligence as a capacity for adaptation, as a capacity for learning, as a capacity for understanding, reasoning, and judging. Intelligence as a capacity ceases to develop just as surely as do other mental traits or physical traits.

In the case of general intelligence it has been supposed by some that this level was reached at 16 years. As a matter of fact, this supposition has never been adequately demonstrated. No large number of unselected adults was ever examined until the recent war. Numerous studies of the results of psychological examining in the army have shown that the average intelligence of native white recruits is approximately thirteen to fourteen years. Similar results have shown that the average intelligence of negroes and the principal foreign-born groups now in the United States is approximately eleven to twelve years. Perhaps this latter conclusion is rendered uncertain by some inadequacy in the measuring scales. As long as we continue to use these scales, however, we can use this conclusion for interpreting test results. If we accept these facts, then our interpretation of mental ages and our calculations of I. Q.'s must be revised. Thus, for native whites a mental age of 13.5 represents an I. Q. of 100 instead of an I. Q. of 85, or vice versa, a standard I. Q. of 85 becomes average normal instead of dull normal. In the case of foreign-born and colored, a mental age of 13.5, instead of representing an I. Q. of 85, would represent an I. Q. of about 120. This I. Q. would have to be interpreted with all the reservations surrounding the interpretation of intelligence according to nationality and color.

I have referred to the fact that the upper limit of mental development for the feeble-minded must not be accepted as being the lower limit for normals. Psychological examining in the army showed that some of the feeble-minded tested as high as twelve and some normals as low as eight for the native white group. If we accept these facts, then a mental age between eight and twelve falls within the borderline zone of mentality as applied to the diagnosis of feeble-mindedness, and can not, therefore, be used as a sole diagnostic criterion. Of course, if the mental age were close to eight, the presumption would be great in favor of feeble-mindedness, and if the mental age were close to twelve, the presumption would be great in favor of normality. By the same reasoning the chances would be even that a mental age of ten was associated either with feeble-mindedness or with normality. Now, a mental age of ten gives an I. Q. of less than 65 if we accept sixteen years as the average mental age of adults. Yet there is today a very strong tendency among examiners to accept I. Q.'s below 70, unsupported by other clinical evidence, as quite positively indicative of feeble-mindedness. This mental age of ten represents an I. Q. of 75 if we accept thirteen and a half years as the average mental age of adults. Again it is far from 100, and yet the chances are only one to one on a mental age basis that the individual is feeble-minded. In the case of the foreign-born and colored this difficulty becomes still greater. If we were to accept the mental age of ten years as indicative of feeble-mindedness, then 50 percent of the colored recruits in the U. S. Army would have to be considered as feeble-minded; but this is obviously absurd.

What use are we making of these facts in the diagnostic work which determines the formation of a special class for feeble-minded? Are these special pupils really feeble-minded or are they only inferior normals? Of course those who are prepared to believe that feeble-mindedness is nothing more than inferior intelligence will not be very much disturbed by this question. Yet practically all clinical psychologists are agreed that there are important qualitative differences between the feeble-minded and

normals of the same mental ages. From the psychological point of view, feeble-mindedness is very much more than intelligence deviation. There are differences in the quality of intelligence as well as in the degree, although we are not now able to state precisely what these differences are. There is something about the feeble-minded which enables every good special class teacher to discriminate between feeble-mindedness and normality independently of direct mental examination. Defective judgment, almost complete lack of reasoning power, suggestibility, and lack of initiative—these characteristics of the feeble-minded have often been mentioned by writers on the subject. On the other hand, the normal person of very inferior intelligence has a measure of common sense which the feeble-minded never possess, and shows initiative, judgment, and resourcefulness to a degree utterly wanting in the feeble-minded.

Mental Types

Recent investigations by Thorndike and others encourage us to believe that there are important differences in intelligence type as well as in intelligence level. To what extent these differences are pure differences in intelligence and to what extent they are influenced by other aspects of mentality, such as the motor aspect, the emotional aspect, or the volitional aspect, remains to be seen. Certainly, however, everyday observation encourages us to believe in the practicability of classifying individuals by type of intelligence as well as by degree; and there are three principal types, verbal, manual, and social. We see these types at every level. Of course correlation is the rule, and in general the average individual is at about the same level in each of these three types of intelligence. The ordinary individual is not so much verbal, or manual, or social, as he is all of these. This is true at the feeble-minded level and at the genius level. But when we speak of individuals we note striking exceptions.

For example, if you were asked to classify Woodrow Wilson or Charles E. Hughes, you would first place them at the upper end of the scale of intelligence. You would not think of either

of these men as having any outstanding manual or mechanical ability, although they are probably not without this trait. Neither would you think of them as being strikingly of the social type, although they are undoubtedly strong in this trait. You would first think of them as being exceptionally powerful in the field of abstract thinking and verbal expression. They are the outstanding Americans of today of the verbal type at the high level.

In the same way if you were asked to classify Henry Ford or Thomas Edison you would place them also at the upper end of the scale of ability. You would not think of them as being exceptionally outstanding at this level in respect to their social characteristics, in spite of such contributions as they have made in the fields of labor, business, and social welfare. Neither would you rank them as of the verbal type, in spite of their excursions into international politics, philosophy, religion, and applied psychology. You would think of them first of all as being mechanical geniuses, outstanding manual types. In so doing you would not deny them capabilities above the average, both in the social and in the verbal field, but you would not credit them nearly so high in these two respects as in the manual field.

Of if you were considering Theodore Roosevelt and Lloyd George, you would unquestionably place them at a high level in general intelligence. You would not deny them manual aptitude or the gift of abstract thinking combined with verbal expression, but their fame is not based on any of these so much as on their remarkable social qualities and their power to interpret the feelings and will of the people. You would, therefore, classify them as social types.

At the lower end of the scale, in your own classrooms you will immediately think of individuals who, in spite of their actual levels of intelligence, have outstanding characteristics in the direction of verbal, manual, or social ability. In general, correlation will be the rule; that is, these three qualities will be about equally present in the majority of your children. But this will not prevent you from singling out particular children as being

exceptionally above their general level in one of these traits. I can think of three such cases at the Training School at Vineland.

Tim is the hand-shaker of the institution. Nobody can be on the grounds for twenty-four hours without being "interviewed" by Tim, who encourages them to see the institution, have a good time, get acquainted, and come again. On my last visit he assured me, "The place is wide open."

Henry is an extreme verbalist. By all language measures of intelligence he rates about fourteen years. He is one of the very exceptional cases who have a mental age above twelve and are yet feeble-minded. The whole social record of Henry indicates, however, that he is of the verbal type, that he can talk and discuss, but cannot do. Being feeble-minded, his verbalism is rather ineffective because it is not directed by the common sense and judgment which would be his if he were normal. His intelligence is expressed in his vocabulary rather than in his practical thought. In spite of his verbal ability he is an incumbrance on society in the station in life to which he was born.

Willie was long rated as an idiot. By the Binet test his mental age was three years. He could not talk or think to advantage. One day he was given a chance in the manual training department and astonished all the teachers by the remarkable success of his work. He reached the highest standards of the class in woodworking, and showed a remarkable aptitude for knitting. His entire record at the institution, both as to personality and conduct, became altogether different as a result of this opportunity to express his latent manual abilities.

This question of types of intelligence is not yet well founded in theoretic and scientific psychology. The development of mental tests is still too incomplete to permit us to do much more than speculate in this field. Common sense, however, indicates the importance of these observations and shows the need for scientific verification.

Non-verbal tests of intelligence are still rather uncertain scientific measures. Moreover, the assumption that an individual who is superior in a non-verbal test will probably be superior in

the field of manual activities is, after all, an hypothesis which has not yet been proved. We have almost no suitable tests for measuring the social type. It may be that this is not so much a difference in intelligence type as a difference in emotional makeup. I have gone thus at length into the psychology of types because I am convinced that many clinicians are making errors in diagnosis because of failure to take account of differences in individuality.

The Role of Emotions

Along with these differences in intelligence type we must not fail to consider the emotional characteristics of the feeble-minded. No need in clinical psychology is now so great as the need for suitable methods of measuring emotional characteristics. This is particularly true among the feeble-minded. With them, differences in emotional type have very grave bearing upon social adaptation because the emotions are not under the same control of the intelligence as is the case among normals.

In spite of the defective intelligence of feeble-minded children, we have continued to use intelligence as the basis for their education. Yet, as soon as our attention is called to it, we must realize that some of the most important bases of education for the feeble-minded are in the emotional field. Everyone knows the motto of the Training School at Vineland, "Happiness first, all else follows." The literal truth of this motto has not yet been impressed upon most of us. Two years ago the President of the American Psychological Association said in substance: "If you want to sell applied psychology to the business man, don't argue and reason with him; apply to his feelings and prejudices. Use the *argumentum ad hominem*." Every politician knows that the crowd is swayed by its feelings rather than by its thoughts, and any psychologist will tell you that the percentage of us who feel instead of think is shamefully large. How much more true this is of the feeble-minded, particularly in their social adaptations. Let us, then, take advantage of the tremendous power and influence of the emotions in daily life and use them to the utmost in special education.

This question of the emotional life of the individual is particularly important from the standpoint of conduct or misconduct. Recent refinements in psychological tests make it possible to separate the stable from the unstable. Future improvements will probably enable us to grade emotional stability or instability on a scale just as definitely as we can now grade intelligence. At present we can deal only with extremes. If our diagnoses are based upon a sufficiently comprehensive group of mental tests, we shall generally be able to detect constitutional instability even in the absence of overt acts. In our institutional experience in New Jersey we have found this practically possible, so much so that the psychological diagnoses now furnish one of the principal bases for psychiatric examinations.

The important possibilities in the field of corrective measures through operative surgery in the medical treatment of instability should be investigated by every department of medical inspection in the public schools. Education and training may go far toward stabilizing the individual; but if there is an underlying physical basis for instability, we can rest assured that our best efforts cannot yield permanent results.

Feeble-Mindedness and Delinquency

We have been told until I, for one, am tired, that the feeble-minded are potential delinquents, as if this were a differentiating, or even diagnostic, characteristic. Indeed this statement has been broadcasted to the extent that it is an all too common fallacy nowadays for children to be diagnosed as feeble-minded on the basis of misconduct, particularly on the basis of repeated delinquency.

The studies of the past two years have shown that delinquency and crime are not nearly so causally related to levels of intelligence as has previously been supposed. So many other factors enter into the causation of delinquency that intelligence is only one of the crowd. It may, to be sure, be one of the most important factors in delinquency, but it is not by any means the all-important factor. Delinquency is probably more closely

related to environment and home conditions than it is to levels of intelligence. It is also closely related to defects in personality which are not necessarily associated with defective intelligence.

In our work on this question in New Jersey we find the proportion of feeble-minded in some of the state institutions varying as follows: at the state prison, 6 percent of the men; at the reformatory, 15 percent; and at the juvenile institution for boys, 30 percent. Now, if feeble-mindedness were an all-important factor in the causation of delinquency and crime, we should expect to find the same percent of feeble-minded in each of these different types of institutions. What then becomes of the juvenile feeble-minded delinquent? He is not always segregated in an institution for the feeble-minded, nor is the law more lenient with him as he grows older. Somehow or other he later adapts himself to a law-abiding life. Nevertheless, he remains feeble-minded. But if he ceases to be delinquent while remaining feeble-minded, we must look to something other than intelligence for the cause of delinquency. All we can say is that the feeble-minded, with their lack of judgment, their suggestibility, and their unfortunate surroundings and opportunities, have somewhat more of a tendency to be delinquent than the normal population, and no doubt they are more frequently caught and committed to institutions.

The place of the special class in preventing delinquency is well illustrated by some figures from Cleveland which I can give with only approximate accuracy. In that city it was found that half of the feeble-minded children under sixteen years of age were in special classes. About two percent of the feeble-minded in special classes became delinquent, while about twenty percent of the feeble-minded not in special classes became delinquent. Information such as this is one of the most important demonstrations of the value of the special class. In our moments of discouragement let us not fail to look upon such achievements as this. Similar experiences could doubtless be related from other sources.

The Role of Volition

In this connection we may find it of value to classify the feeble-minded on a volitional basis as social and anti-social or, in psychological terms, as active and passive. The feeble-minded child who becomes delinquent is found to have certain volitional characteristics in the field of social activity which get him into trouble. Nevertheless, in all our study in the correctional institutions of New Jersey, we are surprised to find that docility is much more common among the feeble-minded delinquents and criminals than among the non-feeble-minded. Our feeble-minded correctional cases are the most trustworthy and amenable of our correctional population so long as they are well treated.

Educational Objectives

One of the most important needs of special education today is a re-definition of educational objectives for the feeble-minded in the light of recent experiences. The work of Dr. Bernstein, at Rome, N. Y., has shown the hopeful possibilities of rehabilitating the feeble-minded under certain conditions of training, placement, and supervision. The work in the special classes at such places as Boston, Rochester, Detroit, Schenectady, Newark, Cleveland, St. Louis, and elsewhere, indicates the possibilities of bringing special class education into relation with the industrial and social life of the communities in which those feeble-minded children who are not institutional custodial cases will live their adult lives. In particular, the very fine work being carried on in the Department of Special Education in Detroit shows what can be done by analyzing the industrial outlets and special capabilities of the feeble-minded. This re-definition of objectives, coupled with improved methods of diagnosis and classification, shows the imperative need for revision of the special class curriculum, both as to content and method. We must get away from the traditional work in the primitive arts and replace it with various kinds of industrial training into which we must infuse the highest possible educational content. As far as possi-

ble, we should sort the manually-minded children with inferior intelligence but some social responsibility from the institutional or custodial feeble-minded. We must sort the trainable from the untrainable.

I am reminded of a motto that I discovered in one of the earliest reports of the Training School at Vineland, which ran: "The proper education of feeble-minded boys and girls is to teach them what they can learn and will make use of when they become men and women in years." This, of course, is an educational policy rather than an educational method. It lays stress upon the necessity for studying the capabilities of the children from the point of view of practical utility. Nothing is so much needed in special classes of today as constructive thinking, leading toward the development of satisfactory courses of study. We are all dissatisfied with the present courses. We see their futility both as educational devices and as training for earning a livelihood. Where is the Moses who can lead us to a better land?

Summary

May I summarize in brief these several thoughts about the feeble-minded as follows:

1. There is danger that the special class movement may not progress as rapidly as it should. In some places special classes are even being given up. In other places the special class is not taking advantage of new experience and knowledge in this field to modify its courses of study and educational methods.

2. We cannot afford to forget that fundamentally feeble-mindedness is social insufficiency, and that no mental age standard alone will enable us to separate the morons from the inferior normals. Moreover, in the case of the feeble-minded, this social insufficiency must be due to lack of intelligence, and the lack of intelligence to arrested development.

3. Intelligence quotients and mental ages have been abused as means of diagnosing feeble-mindedness. Both of these factors are essential considerations in the diagnosis, but must never be considered as sole determinants.

4. Psychological examining in the army has given us new data regarding the borderline zone which separates feeble-mindedness from normality. These data show that the diagnosis of the moron on the basis of intelligence alone is almost impossible. They have also given us a new concept of adult intelligence which should modify our conceptions of the mental age limits of feeble-mindedness and our use of the I.Q.

5. Recent work in psychology has shown that there are differences in intelligence type which are nearly as important as differences in intelligence level. These differences of type still further complicate the diagnosis of feeble-mindedness and the consequent educational treatment.

6. The emotional life of the feeble-minded is perhaps fully as important as their intellectual life; and due consideration should be given to the study of the emotions in the diagnosis of the feeble-minded. Although there are no very satisfactory tests for measuring emotional development or emotional type, it is nevertheless possible to classify the feeble-minded as stable or unstable. The emotional life of the feeble-minded furnishes a much more fruitful basis for their education than we have previously recognized. The special education of the feeble-minded should pay particular attention to emotional development as one of the most important factors in their social adaptation.

7. The feeble-minded can be classified in volitional terms as active or passive, social or anti-social. This is particularly important from the standpoint of conduct and character. Social training or habit formation in the field of character and conduct should be one of the most important functions of training in special classes.

8. A re-definition of the objectives of special class education for the feeble-minded is needed. This re-definition must take account of the social and industrial capabilities of the feeble-minded as demonstrated by recent experiments throughout the country, revealing that with a suitable background of training and a suitable system of supervision a very large number of the feeble-minded can be made self-supporting.

9. The re-definition of objectives calls for a critical survey and constructive reorganization of the special class curriculum. Courses of study should be made more practical without sacrificing anything of their present educational value. In particular, more industrial training and less formal manual training are required.

10. We must revise our thoughts about the feeble-minded in relation to delinquency. Feeble-mindedness alone is seldom an all-important cause of delinquency, although the feeble-minded are more susceptible to delinquency than normal children. The special class can be made a very potent factor in stabilizing the feeble-minded and preventing delinquency.

11. We must carefully consider means for reducing the cost of special class education. Improved classification may enable us to increase the size of the special class without detriment to its success and without increased burden upon the teacher. Every effort should be made to eliminate from the special class children of the imbecile grade of feeble-mindedness. Such children should, of course, be committed to institutions designed particularly for their care.

HERBERT: A STUDY OF DIFFICULTY IN SPELLING AND READING

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The writer's introduction to Herbert was the spelling paper reproduced in Figure 1. The words were dictated early in the semester from a list of test words for the second half of grade II. Herbert's conspicuous failure resulted in a study of his difficulties over a period of several months.

He is a normal appearing boy eight years and nine months old with fair hair, fair clear skin, and blue eyes. His facial expression gives an impression of weakness. He is courteous and obviously well-cared for at home. When interviewed his mother stated that he walked at seventeen months; that he talked normally; and that except for an early difficulty with nutrition, which was not serious, he had had no illness. He had not departed in any way from the "normal" so far as she knew. He began school in the kindergarten of a small city. When he entered the grades, his teacher emphasized his aptitude for music and regretted his "lack of concentration," but she assured his mother that he would "wake up" because he seemed to be "so bright in a general way." Just how, and when, and why she expected this awakening to take place is not recorded.

His report card for the second grade, from September to May, shows that she considered his work excellent or good almost throughout. In March, April, and May, however, his rating in reading dropped from "fair" to "poor." In May, both arithmetic and spelling were "poor" and no other marks were recorded for these subjects. He left school during that month and for that reason was not promoted. The following September he entered the Detroit system and attention was at once called to his case. Herbert's spelling paper when a list of test words for grade II-A were dictated is reproduced in Figure 1.

Since it was believed that no remedial measures should be undertaken without observing the performances which promised

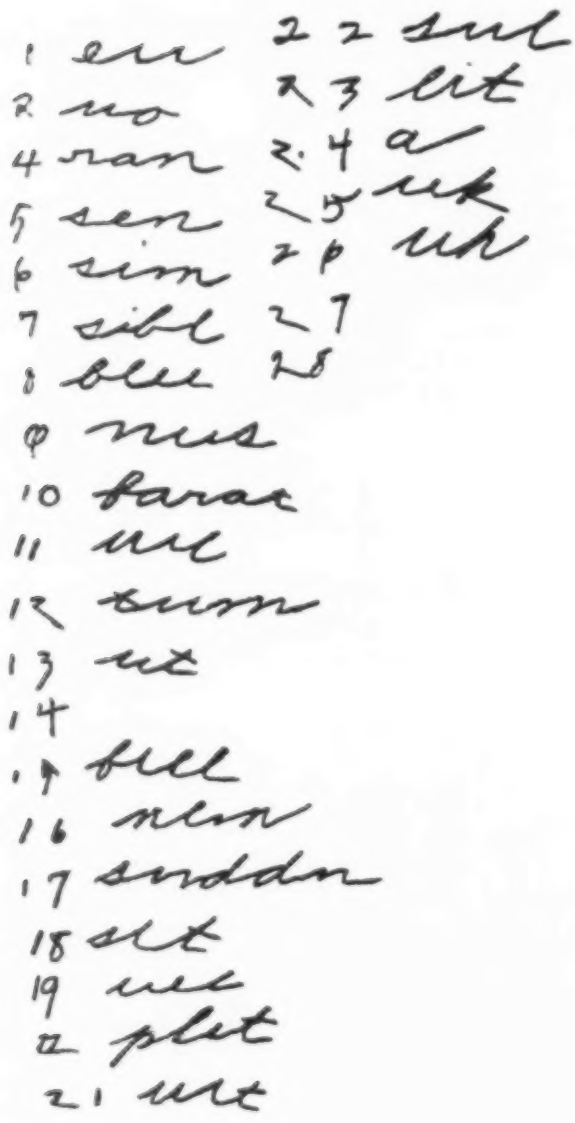

FIGURE 1. HERBERT'S FIRST SPELLING PAPER IN GRADE II-A

to throw light on the cause of his failure, some time was spent in investigating Herbert's efforts to spell and to read, and, later, in attempting to teach him. To present the method of procedure and the results obtained in such a way that other teachers may profit by the writer's experiences with the case is the purpose of this report.

Efforts to Determine the Nature of the Difficulty

His name and seven words taken at random from the first-grade list were dictated to Herbert. Long periods of hesitation and emphatic lip-movements characterized the performance. He repeated letters to himself and tried to "sound out" the words. The written result is shown in Figure 2.

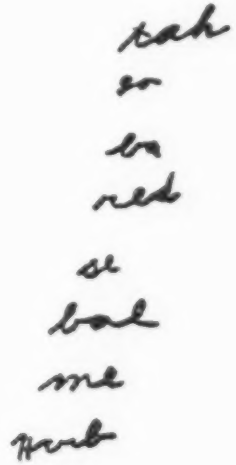

FIGURE 2. HERBERT'S SPELLING PAPER WHEN HIS NAME AND SEVEN WORDS FROM THE FIRST-GRADE LIST WERE DICTATED TO HIM

If it were necessary for him to spell each word as he wrote it, he obviously could not employ the method effectively without clear associations between the spoken name or the sound of the letter and the corresponding form to be written. To determine

his ability in this regard, all the letters of the alphabet were dictated to him by name, and the sounds of the consonants. He wrote e for c, b for f, j for g, g for j, u for w, and w for y. He also confused the sounds of some of the letters for he gave u for w, j for g, and no response for v.

Next he was shown the consonants, and asked to name and to sound them. If he could neither name nor sound them at

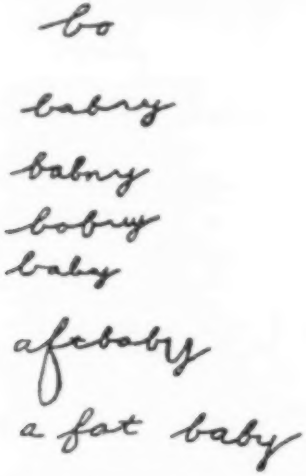

FIGURE 3. SOME OF HERBERT'S ATTEMPTS TO WRITE "A FAT BABY"

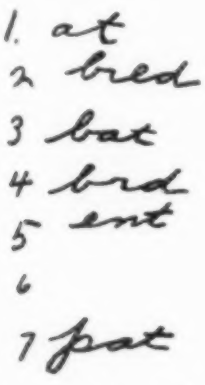

FIGURE 4. ANOTHER OF HERBERT'S SPELLING PAPERS

sight he had no means of acquiring the information which he needed during the study period or which he later tried to use by spelling to himself as the words were dictated. He failed on the names of x, z, c, w, and j; and on the sound of v. Since his failures demonstrated ineffective training but gave little clue as to the cause, it was decided to give him special instruction. Some of his efforts during a ten-minute instruction period on *a fat baby* are shown in Figure 3.

The spelling lesson for the day was next presented to him with instructions to show how he "studied" his lesson. He spent the time repeating letters to himself, bobbing his head, and puckering up his features. What he accomplished when the lesson was dictated is shown in Figure 4. At this point it was discovered that he could read nothing he had been asked to write.

Herbert's score on Gray's Oral Reading test was zero and he required ten minutes to struggle through the first paragraph. Twelve words were pronounced for him, ten were mispronounced by him, and three were repeated. Long pauses between words, unsuccessful efforts to analyze words phonetically, and a tendency to confuse words similar in appearance marked the performance.

A general intelligence test was secured through the Psychological Clinic and his I.Q. on the Binet was 93.

Efficient reading and spelling are conditioned by speedy and accurate inspection of words, characteristic details of which are noted and stored as memories in one field of imagery or another. Pronounced defect in any field of imagery militates against progress in these subjects. This difficulty is increased if the material to be learned is presented with the emphasis limited to a single group of images, as for example, visual. Hoping to get further information regarding Herbert's disability in reading, the examiner experimented with five geometrical drawings from the Detroit First Grade Intelligence Test and with the color cubes. Herbert was permitted to look at each drawing for five seconds, and was then asked to reproduce it. Two exposures were made of the last, the most complicated one.

His lines were uncertain but the designs were duplicated with the exception of the last one which was a complete failure. The test drawings are given in Figure 5 and Herbert's drawings are reproduced in Figure 6.

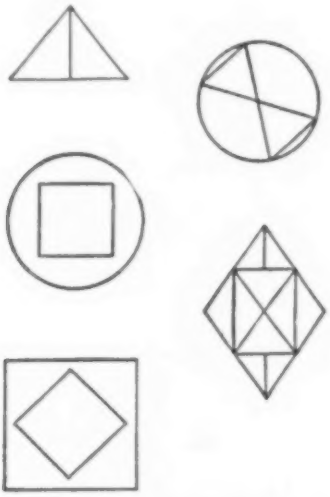

FIGURE 5. GEOMETRICAL DRAWINGS FROM THE DETROIT FIRST-GRADE TEST

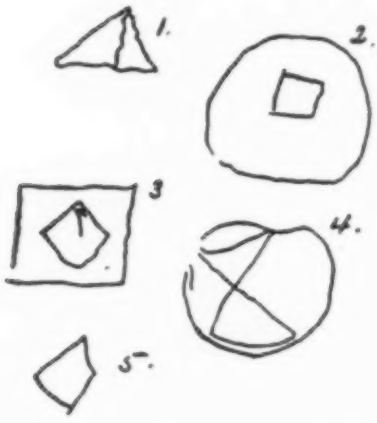

FIGURE 6. REPRODUCTIONS OF HERBERT'S DRAWINGS

The color cubes commonly used by kindergarten children in making designs were used as a performance test. This material consists of sixteen one-inch cubes. Four of the surfaces of each cube are dyed a plain color—blue, yellow, red, and white. The other surfaces show two triangles each—one pair blue and yellow; the other, red and white. Each design for the arrangement of the color cubes was presented for five seconds, then removed, and Herbert attempted to reproduce it with the cubes. Herbert's success in this test is reported in Table I. When the

TABLE I. RESULTS GAINED WITH THE COLOR CUBES

Design	Trials	Time	Result
Red and white squares placed alternately (4 cubes)	1	15″	Success
Blue square on a yellow background (4 cubes)	1	20″	Success
Blue diagonal (4 cubes)	2	a. 20″ b. 30″	Failure Success
Single blue chevron (4 cubes)	4	a. 200″ b. 120″ c. 15″ (after instruction) d. 40″ (after last design)	Failure Failure Success Success
Double blue chevron (8 cubes)	1	60″	Success

single chevron (4) was removed, Herbert closed his eyes for a few seconds and then, placed two blocks correctly (a). Then he held the four cubes out before his face, inspecting them carefully and repeated this performance several times before the design was exposed again. On the next trial, (b) he again held the cubes before his eyes, placed two correctly, made several changes, and finished with three correct.

Then the examiner said, "Watch me" and she traced the outline of the chevron three times with the point of her pencil. The design was then broken up, re-formed, and Herbert was instructed to trace it with his fingers. When the cubes were removed, he formed the design correctly at once (c) and again succeeded (d) after he had formed the more complicated design of a double chevron.

No evidence of a mental defect so serious as to prevent school progress was found, but it was thought that both visual and auditory imagery were weak and that any method of learning used with him or taught to him should be adapted to meet this probable condition. Taking the cue from his success with the color cube design after a *motor* experience with it, it was hoped that proper kinaesthetic and articulatory experience with material to be learned would provide the needed reinforcement and result in a proper balance of visual, auditory, and motor imagery. Phonetic analysis of both spelling and reading vocabularies had been over-emphasized without his having acquired the information necessary for such analysis.

Remedial Measures and Results

It seemed reasonable to suppose that Herbert would most readily learn to spell the words which he could read at sight. The concept of such a word would thus be rounded out and his experience with it be more satisfactorily complete than with a word which he could not read. Spelling, as such, was therefore put aside temporarily and emphasis put upon reading. The general instruction was to present a reading vocabulary starting on a first-grade level, by rote rhymes, stories, or sentences; by action play; by labelling objects; and by incidentally telling him words.

Each word which he found difficult was noted and his attention directed to the details and characteristic features of it. It was then written in large script on the board where Herbert traced the outline over and over again with two fingers, pronouncing the word aloud each time as he finished. In the beginning, practically every word went into this "difficult" list. When he felt sure of it, the word was erased and he tried to reproduce it in large script. This exercise was explained to him as an appropriate method of study and the importance of size and of accurate letter formation was emphasized. His mother cooperated, providing large sheets of paper which he used at home, and the teacher agreed to provide blackboard space for him to use at study time.

By November, he was able to recognize sixty-one primer words in two minutes and to write many of them. As he progressed, he seemed increasingly able to learn words with a minimum of motor experience. It may be that the common elements of these motor word-experiences became blended into an apperceptive background which were effective in more than the limited-to-one-word situation.

His teacher reported "improvement" in spelling at this time and special instruction in the subject was carried on with instruction in reading. He studied only the words he could read. The method used is described in some detail.

He looked at the word carefully and pronounced it, comparing what he *saw* with what he *heard* as he did so. He named the letters. Then he closed his eyes "to get a picture" of the word, and then wrote it. He located errors by comparing this with the correct form. If the error concerned a part which he "could see but could not hear," the crucial spot was emphasized by such means as coloring, printing, or enclosing in a square or circle. If the fault was auditory, he pronounced the word carefully, inspecting it as he did so, and in any case, repeating the study process until he had written the word correctly three times.

The following facts show his progress in each subject:

Date	*Reading Material*	*Result*
September 20	Gray's Oral Reading Test	0—Complete failure
November 1	61 Primer words	Recognized in 2 minutes
December 21	Aldine Primer	Completed
January 4	Gray's Oral Reading Test	0—Marked Improvement. Read three paragraphs. Low time score.
February 20	Aldine First Reader	Completed
March 7	Gray's Oral Reading Test	35—First-grade standard is 31
April 7	Aldine Second Reader to p. 150	Completed
April 7	Gray's Oral Reading Test	43.7—Second-grade standard is 43
June 19	Promoted to III-B	
December 11	(date of this report)	Doing satisfactory work in III-B

Date	*Spelling Material*	*Result*
September 19	25 II-A words	0 correct
October 13	His name	Correct
October 28	Four short sentences	1 error
	Five words in list	Correct
January 2	Began II-B course of study in spelling	
January 18	Eight II-B sentences	3 errors
	Six words in list	Correct
February 17	Regular II-A lesson in classroom	Correct
March 6	21 words in list from II-A and II-B	8 errors
May 8	Reported doing satisfactory work in II-A	
May 25	25 words final test	1 error
June 19	Promoted to III-B	
December 8	25 words from III-B list	Correct

There is every evidence that Herbert will hold his own. But there must be sympathetic understanding on the part of the teacher; and the speedy recognition of a difficulty followed by specific effort to correct it is essential. Such a course will prevent trouble for Herbert as it will for any child and prevention is always better than cure.

A SPELLING-BOOK SCORE CARD

MANSON GLOVER
Philadelphia, Pa.

This score card is an attempt to reduce to a quantitative basis the comparison of two or more spelling texts. The following general method is suggested:

Do not consider the books only; obtain from the publishers all definite statements possible as to the merits and history of the texts, and examine these also. Obviously there is much that is important concerning a speller that is of no significance to the children and that therefore should not be included within its covers; for this material it is necessary to consult other documentary evidence. Get this evidence before you before beginning your comparison.

Study the field point by point, not book by book. The latter method gives the first book and the last book studied great advantages, and introduces the vitiating element of fatigue. Examine first the vocabularies of all books for sources, and give each book its score. Then examine for method of selection, and score each on that point. Next determine how well each has placed important words early, and so on. In this way complete impartiality is easily secured.

In scoring each point first pick the best book under consideration and give it the maximum score indicated, then rate each of the others in ratio to that maximum as in your opinion it compares with the best. The possible score is 100; the actual score of any text will then be approximately the percent which it contains of the best elements of all spellers on the market.

The points stressed have been carefully chosen; the notes to the score card refer direct to the bibliography appended. This bibliography is not comprehensive, but refers to the most important recent investigations and gives authoritative grounds for practically all positions assumed in any controversies by the score card.

Book	Maximum	Score
A. Vocabulary		
1. Compiled from best sources	8	....
2. Selected scientifically	4	....
B. Grading		
1. Important words early in course	4	....
2. Easy words early in course	4	....
3. Grade needs recognized	4	....
C. Method of Presentation		
1. Recognition of individual differences		
a. Testing before study	12	....
b. Use of standard scores	2	....
2. Provision for independent use		
a. Individual activity of pupil	10	....
b. Study method provided:		
(1) Emphasis on writing word	6	....
(2) Use of visual, auditory, and speech-motor images and syllabication as preliminary steps	4	....
3. Review		
a. Number of times that all words are checked	6	....
b. Provision for increased review in case of stubborn difficulty	4	....
c. Immediacy of first review after learning	6	....
d. Timing of subsequent reviews	4	....
4. Showing pupil improvement	4	....
5. Method of checking learning efficiency	4	....
6. 100 percent aim	4	....
D. Book		
1. Durability and price	4	....
2. Type and paper	4	....
3. Attractiveness	2	....
Total	100	....

Notes on Score Card

A1 Authorities are fairly unanimous that the best material is that of correspondence. See Cook, pp. 7, 127, 129; Ayres, Anderson, Horn, Houser, *Eighteenth Yearbook*.

A2 It is suggested that no investigation is particularly valuable in this respect unless impersonally and mathematically conducted. References, Ayres, Anderson, Cook, Horn, Houser, *Eighteenth Yearbook*.

B These criteria are well recognized, there is substantially no argument except over B3. Very little material is here available, the

only sources not contradicted by others equally or more authoritative are the investigations of reader content in primary grades appearing in the *Twentieth Yearbook*, Committee on Silent Reading. These should be recognized. General reference, *Eighteenth Yearbook*.

C1a *Eighteenth Yearbook*, sections 15-17; Ritter, Pearson.

C1b Reference, *Eighteenth Yearbook*, section 41.

C2a Tidyman, *Eighteenth Yearbook*, Ritter.

C2b1 *Eighteenth Yearbook:* Suzzallo, Colvin.

C3a Do not confuse number of checks with number of printings. Dependence for repetition on inclusion in book at subsequent pages, etc., conflicts with principle "b" of this section. The optimum number of checks implies the column method of presentation, (on this point reference Hawley). References, *Eighteenth Yearbook*, Cook, Meuman, Ebbinghaus.

C3b Watt, Winch, *Eighteenth Yearbook*.

C3c Watt, Ebbinghaus, Winch.

C3d Watt, Ebbinghaus, Winch.

C4 *Eighteenth Yearbook*.

C5 *Eighteenth Yearbook*.

C6 Tidyman, *Eighteenth Yearbook*. This is what is meant by the "spelling conscience." (Distinguished from "spelling consciousness.") To the development of this aim is necessary a constant checking of new words for some time after they are first studied.

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Editorials

ACCURACY

There is not an operation in the collecting, summarizing, and interpreting of numerical data where the tendency to error is not present. We are beset from the first planning of our work to the last revision of printer's proof by hostile forces in various and insidious forms—forces which are constantly at work to rob our findings of their value, forces which at every point challenge our judgment, our industry, and our ideals. The thing we call accuracy is hard to attain even to a satisfactory relative degree while to attain it absolutely is in most matters quite impossible.

Fortunately, however, accuracy in the absolute sense is not for most purposes worth pursuing. It would not, for example, be worth while to obtain the valuation of a school district to the last cent nor to know the floor area of a schoolroom correct to the nearest square inch nor to compute the average writing ability of a class to the third decimal place. A difference of a few cents on the tax duplicate is unimportant. A dozen square inches more or less in a surface containing approximately 100,000 such units is of no consequence. A writing ability of 65.378 on the Ayres scale has little meaning beyond the integer. Evidently, then, there are instances where meticulous accuracy is not worth the labor of attaining it because small differences are immaterial.

Indeed, such differences may even be meaningless or absurd. In the Nassau County Supplement to the Hillegas Composition Scale the unit of merit is that difference between two compositions which 75 percent of judges can distinguish; in other words, the unit is so small that 25 percent of judges fail to sense it. What possible meaning can 0.01 or 0.001 of such a unit possess? Again, if it is reported that three boys are 7, 9, and 6 years old respectively, to state their average age as 7.33333 years is not

only pretentious but actually absurd. Each boy's age having been given presumably to the nearest year is subject to a maximum error of half a year. According to an easily demonstrated principle the average is likewise subject to a possible error of half a year. To express the average, therefore, to hundred-thousandths of a year is "drawing it a bit fine." The accuracy, then, which we should seek to attain has evident relation to the purpose to which our figures may be put and to the precision of the units at our disposal.

In the actual conduct of an investigation we may distinguish three phases: (1) the gathering of information; (2) the organizing of the data; and (3) the making of a report. In each of these processes accuracy should be sought—accuracy, that is, to the extent of rendering our results as useful for our purpose as the conditions of the inquiry permit.

Most of the conditions which limit our entire subsequent procedure are encountered in the first phase of the work—namely, in the collecting of the facts. Here we should be especially painstaking. Definite planning and exact definition will be needed. The precise formulation of the captions by which our data will be described, the objectivity of our primary entries, and careful definition of terms should be attended to. For they will not attend to themselves. How necessary it is, even at considerable sacrifice of time and energy, to make a good questionnaire is only appreciated after one has tried to tabulate the returns on a poor one. If the schedule according to which we secure our information is faulty, all our subsequent endeavors cannot rid our investigation of material error.

Nor is it less important for us to define our terms. The reason why it is so notoriously hard to state accurately such a simple fact as the number of faculty members in a college or university is precisely because the term "faculty member" is not defined. Do we include assistants? If so, does an assistant who does no teaching count? Do we include fellows, teaching or non-teaching? Are faculty members on leave of absence counted, and if so are the substitutes who are taking their places also

counted? How are part-time persons to be handled, and those engaged entirely in administrative work, and those who do extension work? In short, who are faculty members? Similar difficulties will often be encountered concerning matters which at first seem unequivocal. What, for example, is a word, a class, a schoolbuilding, a library book, a college student? If our investigation calls for the use of units of this sort, we must define them; and the whole subsequent inquiry will be affected by the decisions we reach in these respects.

In organizing our data we must continue to be accurate. In particular we must know how accurate our returns permit us to be. We owe it to our ourselves and to those who will consult our findings to know some of the accuracy theorems. Let us illustrate one. It may be phrased this way: "A total can be no more accurate than its most faulty item." Suppose that we wish to obtain the total number of books in the school libraries of a city. Let us further suppose that an actual count of the books is available for all but one of the libraries while for this library we only have an estimate of 600 volumes. If the exact total, exclusive of this estimate, is 5717, we cannot properly add 600 to this and report 6317 as the result of our inquiry. As an estimate, "600" means between 550 and 650; i. e., nearer to 600 than to 500 or 700. In other words there is a maximum error of 50. This same maxmium error inheres in the sum. Accordingly, 6300 is the correct report—and this is more accurate than 6317 because it does not pretend to be what it is not.

The worker should familiarize himself with such matters. Some good suggestions are to be found in King's *Elements of Statistical Method*. Bowley's *Elements of Statistics* gives a mathematical treatment of accuracy, including the proofs of a number of theorems.

But quite apart from these technical matters, the willingness to take pains will go a long way towards securing a respectable degree of accuracy. We have reason to believe that there is not a general realization of the extent to which errors will creep into statistical work unless definite precautions are taken to keep them

out. Whenever figures are copied, for example, they must be checked back upon the originals. If they are not, we may be quite certain that some of them will be wrong. Figures arranged in columns should be totaled, cross totaled, and balanced merely as a checking device whether the totals are wanted or not. In the making of tables duplicates should, if possible, be made by two persons working independently. If this is not possible the figures and computations should certainly be checked by a second worker. It is good office procedure when making corrections to cross out rather than erase the figures supposed to be wrong and to write the correct figures in red.

The same willingness to take pains must continue to be manifested after copy has been placed in the hands of the printer. The mere labor of seeing a report through the press, as such labor should be performed, is very great. Of course the printer's copy must be carefully edited. This is the place to do the editing, not on the proofs. A copy of the corrections on the first galley proofs should be made on the retained proof. This prevents loss and perhaps controversy as to author changes. If the manuscript has been properly edited, there will be no need of verifying totals and computations on the galley. But on the page proof, not only should one ascertain that corrections indicated on the galley have been made, but one should also verify the computations or read back to the manuscript copy. Types are sometimes disturbed in making corrections, and do not get back into their proper places.

The price of accuracy is quite evidently eternal vigilance. The degree to which it is feasible or desirable having been determinded in the light of purposes and the nature of the data with which we deal, one must persistently strive for it by defining terms and simplifying procedure while gathering the information, by applying the known theorems concerning accuracy, by adopting an accuracy routine during the compiling, tabulating, and interpreting of the data, and finally by painstaking care during the period when the final report is passing through the hands of the printer.

Statistical workers have urged—and their advice is quite generally followed today—that every coefficient should be accompanied by a statement of its reliability. This is customarily done in terms of the P.E., as $r = 0.66 \pm .08$. Such statements of reliability are deduced from the mathematics of the process involved. They give no idea of the accuracy with which the figures were obtained, copied or calculated. To the thoughtful student a statement of the methods used to insure absolute clerical accuracy is often as valuable as any statement of reliability. Sometimes one wishes to know whether the copying or calculations have been checked by a second person; sometimes, as in scoring papers, one wants to know what training the clerks had and how their work was checked; and sometimes a short statement of the method of handling the data gives one an idea of the care exercised.

With particular reference to educational workers, we believe that ideals for insuring accuracy are not as high as they should be. Very likely this is likewise true of workers in other fields. Not only—as we have had repeated occasion to know in our editorial work—do figures in different tables of the same report often fail to "check up," but little effort appears to have been made to rid the data of such error as even an editor may detect. Some of the most competent workers are so much interested in devising tests and increasing the volume of material on which their conclusions rest that they have failed to devote the attention to accuracy which, in our judgment, it demands.

B. R. B.

Reviews and Abstracts

STRAYER, GEORGE D., ENGELHARDT, N. L., and EVENDEN, E. S. *Report of the survey of the public school system of Atlanta, Georgia.* New York: Teachers College, Columbia University, 1922. 2 vols.

This study of the public school system of Atlanta, in the school year 1921-1922, was made by the Division of Field Studies, Institute of Educational Research, Teachers College, Columbia University. It is published in two volumes, each of about 250 pages. The first is wholly devoted to studies of the school buildings and the building program, directed by Professor N. L. Englehardt. The second volume is devoted to studies of "Organization and Administration," "School Costs," "Classification and Progress of Children," "the Teaching Corps," and the "Educational Program," by N. L. Engelhardt and E. S. Evenden.

Atlanta has 63 school buildings, of which 44 are devoted to the education of white elementary pupils, 15 to the education of colored elementary pupils, and 4 to the education of white pupils of high-school age. Upon comparing its school buildings with those of Baltimore, Omaha, and St. Paul—in which surveys were made under the same management as the present one—Atlanta's situation is found to be inferior to that of these three other cities. The deplorable condition of the school plant, for both white and colored pupils, is clearly set forth in detailed studies of buildings, sites, playground provisions, auditoriums, gymnasiums, libraries, lunch rooms, laboratories and shops, and rooms for school officials.

On the basis of careful studies of population trends, school enrollment, the conditions of the present buildings, and the overcrowding now existing in certain schools, together with temporary housing, recommendations are formulated concerning the part which each individual school building is to play in the future building program, for which a bond issue of $4,000,000 has already been voted.

At present the superintendent of schools is elected for a term of one year, and the "Rules and Regulations of the Board of Education" make him responsible for only a small fraction of the tasks which are performed by the superintendent of any large school system. The report proposes a reorganization of the Board of Education, and recognition of the superintendent of schools as the chief administrative officer of the board, with a term of office of not less than three years.

Studies of school finances and costs lead to the conclusion that Atlanta has been spending relatively very small amounts on her public schools, and that in order to attain the highest efficiency in her school system, she must spend at least three times as much as at present for educational and business

administration, and from six to ten times as much on such auxiliary agencies as libraries, health service, school lunches and physical education.

There are seven grades in the elementary schools of Atlanta. Studies of age-grade charts for both white and colored pupils show that the big majority of students are distinctly over-age. The extremely wide range of pupils of a given age throughout the grades indicates a serious lack of adjustment and proper classification of pupils. There is need for special and ungraded rooms.

Seventeen percent of the elementary school teachers have their training above elementary school—seventh grade—limited to 4 years; and 77 percent of all white elementary teachers have training limited to 6 years beyond the seventh grade. The report recommends a salary schedule which shall provide that no teacher be appointed to teach in any branch of the public school system who has not had at least six years of academic and professional training above the elementary school. A minimum salary of $1200 is provided for such teachers with 6 annual increments of $125.

For teachers in junior and senior high schools, with a minimum academic and professional preparation of eight years above the elementary school, the minimum salary is put at $1,600, with ten annual increments of $150, bringing the maximum to $3100. It is recommended that there be no distinction in salaries in elementary, junior or senior high schools, where the professional training and experience of the teachers are the same.

At the present time, there is almost complete lack of coordination among the high schools. The requirements for graduation are, in all cases, too heavy. The prescriptions are too rigid, indicating failure to conform to individual needs. Vocational courses are inadequately provided. No high-school facilities are provided for colored pupils at present.

The report recommends the adoption of a K-6-3-3 plan of organization of the school system, and the board of education has already recorded its approval of this organization. This reorganization involves many very serious administrative difficulties, and will require many radical changes in the high-school curriculums, concerning which the report offers suggestions and recommendations.

This report, as a whole, is a careful and scholarly piece of work that will undoubtedly be extremely valuable to the city of Atlanta in its attempt to put its public school system upon a modern basis, and it will be read and studied with interest by specialists in education everywhere. The illustrative, tabular, and graphical material is particularly to be commended. This report is a genuine contribution to the literature of this field of education.

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KNAUTH, OSWALD W. "*Distribution of income by states in 1919.*" National Bureau of Economic Research. New York: Harcourt, Brace & Co., 1922. 30 pp.

"Distribution of Income by States in 1919" gives a cross section tabulation by States of the figures for national income previously presented for

the country as a whole in two reports by the National Bureau of Economic Research.

The book is a nice example of the use of the methods of statistical approximation. There are no completely comprehensive figures available on the basis of which the income of the inhabitants of the different States of the Union may be computed. There are, however, income tax returns by States, and figures compiled by the Bureau of the Census, the Interstate Commerce Commission, and the Department of Agriculture, showing directly or indirectly different phases of income. By a careful analysis of these figures Doctor Knauth has estimated the income for each State for the year 1919. In a field where precise accuracy is not possible he gives us approximation which will be of great value to workers in the social sciences.

For the school man these figures give a better measure than has heretofore been available of the ability of States to support schools. An interesting comparison may be made between Doctor Knauth's figures for state income and the index number for state school systems prepared by Colonel Leonard P. Ayres. The coefficient of correlation between these two sets of data, computed by the Pearson method, is 0.73. Between state income and the educational components of the Ayres index number, the correlation is 0.76, and between income and the financial elements of the index number 0.67. It is interesting that there is a somewhat closer correlation between income and the educational elements than between income and school expenditures.

The states in which the largest incomes are reported are in general those having large urban populations, but a number of the rural states—Iowa, Nebraska, South Dakota and others—rank high, partly due to the fact that 1919 was a year of exceptionally high farm prices.

The Pacific Coast states are the geographical division showing the largest per capita income of just under $800, while the East-South-Central States show the lowest per capita income of $364. The following table gives an analysis of income by geographical divisions:

	Total Income (millions)	Per capita Income	Average income per person gainfully employed
Pacific	4,432	$796	$1,837
Middle Atlantic	17,425	783	1,886
New England	5,359	724	1,657
East North Central	14,681	684	1,725
West North Central	7,650	610	1,668
Mountain	1,963	588	1,564
West South Central	5,030	491	1,354
South Atlantic	6,473	463	1,212
East South Central	3,240	364	979
United States	66,253	627	1,592

Doctor Knauth's book will take its place with the other two volumes on income by the National Bureau of Economic Research as a book of frequent reference for the worker in the field of national school statistics.

Federal Reserve Bank of New York W. RANDOLPH BURGESS

TERMAN, L. M. and OTHERS. *Intelligence tests and school reorganization.* Yonkers-on-Hudson: World Book Company, 1922. 111 pp.

Diagnosis by means of mental and educational tests has developed far beyond therapeutics. This is inevitable since so large a share of research activity in education has, in recent years, been expended in the production of tests and scales. What to do with the results of a testing program is now an increasingly insistent inquiry. By all those interested in the practical application of mental tests in schools this little book will be eagerly welcomed, giving as it does representative experiments in school reorganization and readjustment. It is the report of the Subcommittee on the Uses of Intelligence Tests of the N. E. A. Commission on Revision of Elementary Education.

Terman, editor of the report, gives an admirable statement of the problem of individual differences and points out that there are two, and only two, possible solutions: (1) individualization of instruction and (2) more homogeneous class groups.

Dickson describes the most notable and comprehensive experiment of the second type—the Oakland-Berkeley Three-Track Plan begun at Oakland in 1918 and at Berkeley in 1920. The very able pupils are put into special accelerated classes who are either given an enriched curriculum with normal pace or allowed to travel at a more rapid pace with less enrichment of the curriculum. The large middle group are in regular normal classes. The lower group are in special limited classes of which there are three types—opportunity classes for those of good mental capacity but who have fallen behind because of illness, transfers, or language difficulties; limited classes for the slow; and atypical classes for those retarded three years or more. The atypical classes are limited to sixteen pupils. The normal classes are increased to forty or fifty pupils. The result is that an effective reorganization has been accomplished with little, if any, increase in cost. The plan has the hearty support of pupils, teachers, and parents.

Sutherland describes the most significant experiment of the first type—the Los Angeles Adjustment Plan. Special ungraded or adjustment rooms are provided, one for the lower grades and one for the upper grades. In addition, there are upper and lower English adjustment rooms for children of foreign parents and development rooms for very backward and feeble-minded. When a child has attracted attention by his failures he is referred to the psychologist for determination of his strengths and weaknesses. He is then placed in an adjustment room where he receives intensive individualized instruction until such time as he can be restored to the regular classes or must be transferred to a development room. The regular classes are thus constantly relieved of those who clog the educational machine and the laggards are given the individual attention that they require.

Franzen gives a valuable discussion on combining the results of intelligence tests and educational tests to determine the accomplishment ratio. It will be difficult for the reader not trained in statistics to follow the interrelations of the various subject ages, quotients, and ratios, though the brief chapter is stimulating and worth while.

Tupper shows how intelligence tests may be used effectively in a small school system where wholesale reclassification can not be undertaken.

Fernald in the last chapter shows the use of mental and educational tests in diagnosing special disabilities in spelling and reading. Work with four hundred poor spellers over a period of eight years has shown the essential psychological factors in correct spelling and the remedial treatment required. Students of psychology and education would be interested in a fuller description of these experiments, in view of their reported success. Highly interesting work with non-readers and special work with reading and writing in the case of first-grade children illustrate the value of intelligence and educational tests in diagnosing disabilities.

The book gives a splendid selection of typical experiments in school readjustment and should be of suggestive value to every superintendent and student of education.

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University of Wisconsin

MILLER, H. L. *Directing study.* New York: Chas. Scribner's Sons, 1922. 378 pp.

"The aim of this book," as the Preface announces, "is to direct study toward mastery through creative thinking." The author, while reacting strongly against the traditional recitation system, shows excellent judgment in avoiding the pitfalls of theoretical extremism. He neither disregards the interests of the pupil nor permits these interests to degenerate into whim. In general his aim is to relate educational subject matter to the experience of the pupil in such a way as to elicit a response that is not merely a perfunctory reaction to pressure exercised by an external authority, but a spontaneous and sustained activity, directed toward a worthy end.

The method for transforming the lockstep of the recitation method into creative thinking is illustrated by numerous and effective examples. The illustrations are taken from a fairly wide range of classroom problems and situations, and they offer much that is suggestive to the teacher who desires to raise the quality of his work above the level of routine learning. The book is a serious and commendable effort to improve the work of the classroom at a point where improvement is most needed.

For the very reason that the exposition is so largely bound up with concrete situations, it is hardly possible to give a specific account of the contents of the book within the limits of a brief summary. It is true that the book is by no means made up entirely of such material. Approximately half of the volume consists of general discussion. These two halves, however, are not closely interrelated; and this constitutes the chief defect of the book. The first half of the book, which contains most of the illustrative detail, would be more effective and practically useful if it were based on a more penetrating analysis of the thinking process with the cultivation of which the book is especially concerned. In this part there is less theory than would be desirable. The second half offers an outline of an educational philosophy that is not

brought into organic relation with the topic of the book. It may be added that the opening chapter, which is entitled "A Manual of Suggestive Procedures" is a somewhat abrupt and not altogether happy introduction to the rest of the work. The procedures suggested are mostly too sketchy to produce conviction. This chapter would appear in a more fitting context and would carry more weight if it were preceded by some of the other chapters of the volume.

To many readers these criticisms will perhaps seem of minor importance in the light of the fact that the book offers so many concrete suggestions for the stimulation and guidance of thinking. The importance of the aim that the author has in mind is gaining increasing recognition; and this volume is deserving of a cordial welcome as a contribution towards the realization of this aim.

B. H. BODE

Ohio State University

BENSON, CHARLES E. *The output of professional schools for teachers.* Baltimore: Warwick and York, 1922. 88 pp.

This study considers 8,790 graduates of two-, three-, four-, and five-year college curricula of 22 normal school and state teachers' colleges of the years 1910 and 1915. Eleven of these teacher-training schools are located in the middle west, and seven are in the eastern part of the United States, while two are in the south, and two in the west. Eleven of them are state normal schools; seven, state teachers' colleges; three, city training schools; and one, the teachers' college of a state university.

Mr. Benson finds that (1) only 6 percent of his sampling entered "any field of service in the open country" the first year after graduation; (2) 50 percent taught first in city schools; (3) about half went into supervised systems and that this proportion has not changed materially in ten years; (4) the "dominant demand (75 percent) was found to be for teachers in the elementary grades," and that there was "no evidence of a demand for certain curricula at present offered"; (5) graduates of teacher-training institutions returned a longer service to the state, for from the graduates of two-year curricula of 1910, 9.5 years of service had been rendered by 1921, while the general teaching population averaged from 4 to 5 years during that period; and (6) 15 percent of the group studied did not teach the first year after graduation but remained at home.

He closes his study with six specific suggestions, the most important of which are that student accounting in any teacher-training institution "should be placed on a business basis" and that "the responsibility of the institution does not end with the graduation of the student." As to the former he finds but one of the schools studied, the State Teachers' College, Charleston, Illinois, which has a proper attitude and keeps a cumulative record of each graduate. He does not discuss the latter except to suggest the continuation of this record as long as the graduate continues to teach. Perhaps he considers this outside of his problem, but expert opinion and a few studies have proved that

a low level of teaching skill exists among two-year graduates of teacher-training institutions. This should afford an opportunity for him to emphasize the necessity for a continuation of teacher-training contacts after graduates begin to teach under contract so that many may be saved from failure and all may return to the state service on a higher level of teaching skill.

FREDERICK L. WHITNEY

State Teachers' College, Moorhead, Minnesota

UPTON SINCLAIR: *The goose step*. Pasadena: Upton Sinclair, 1923. 478 pp.

"And while there, now tell me did you notice
They were all out of step but Jim?"

By writing *The Goose Step*, I take it, Mr. Upton Sinclair makes a bid for a place among the great satirists of literature. We have Cervantes, Butler, Pope, Swift, Thackeray, Lowell, and others. And now comes Mr. Upton Sinclair, offering *The Goose Step*, an extravagant burlesque of the socialist attitude toward the universities and colleges of the United States.

Basing his extravaganza on the extremist's belief that everybody else is wrong, Mr. Sinclair has built up a clever take-off on the opposition that a number of agitators display toward American institutions. The book shows evidence of being hastily written and contains a number of minor inaccuracies, but these faults only serve to keep it in character with the sort of literature produced by those who regard themselves as free thinkers in the field of political science. The author takes up the principal universities and discusses them individually and collectively at length from the standpoint of the radical reformer. Columbia, Harvard, Pennsylvania, Princeton, Yale, California, Stanford, Washington, Minnesota, Illinois, Chicago, Michigan, Clark, Cornell, and others, together with his own alma mater, the College of the City of New York, are all represented as under the thumb of the Money Trust. Elaborate data deck the indictments in every case.

In order to make the satire more effective Mr. Sinclair sacrifices himself instead of inventing another Don Quixote, a Hudibras, or a Gulliver. He takes the principal role himself and advances against the Mammon-governed campuses with a deep sneer on his face, with fire in his eye, and with ample mud in both hands.

There are always a number of matter-of-fact people who cannot see a joke. To such who take Mr. Sinclair literally it may seem that, in the case of the College of the City of New York and in the case of Columbia University, the author bites the hand that fed him. To which accusation Mr. Sinclair in his character of author of *The Goose Step* seems to imply that they fed him nothing or, at best, that when he asked for bread they gave him a handful of pebbles. Assuming that he is correct in such a contention, he really is not guilty of ingratitude.

Mr. Sinclair follows the general outlines laid out by his great predecessors. He furnishes his hero with a breastplate of sublime self-esteem. Says he:

"I went back to college and made up my lost months in a week or two, and passed my examinations without either credit or discredit—ranking just

in the middle of my class. I take it that the purpose of education is to discover the special aptitudes of the student, and to foster them. And here was I, a man with one special aptitude; here were a score of teachers, with whom I had been in daily contact for five years; yet I am sure, if those teachers had been told that one man in the class of '97 would come to be known throughout the civilized world in less than nine years, they would have guessed more than half my class-mates before they guessed me."

Neither Hudibras nor the Brigadier Gerard ever said it better than that.

Farther along in the book, however, Mr. Sinclair caps it. Referring to his experiences at Princeton University and to Woodrow Wilson in particular, he writes, "If only there had been some way by which I could have warned the world concerning this eloquent college president who did not mean his golden words—what a tragedy to mankind might have been averted!"

The book is bedizened with characteristic epithets and nicknames similar in character and purpose to those found in the more restless type of liberal literature. Dr. Nicholas Murray Butler is referred to again and again as Nicholas Miraculous; the University of Pennsylvania is referred to as the University of U. G. I.; regarding Doctor Barrows of the University of California, he writes, "So our 'soldier president' has just asked to be excused from his job, and allowed to become once more a humble Professor of Political Ignorance"; he calls General Wood "a second-rate regimental surgeon at the Presidio in San Francisco, who had the fortune to become a favorite of Theodore Roosevelt, and was by him rushed to a high command in the army, against the unanimous protest of army men." Later he refers to General Wood again as follows, "But here is a man who has never been an educator, and is not even a graduate of a university; a military autocrat, utterly out of sympathy with the true ideals of education."

Probably these references to General Wood are Mr. Sinclair's best illustrations burlesquing the writings of the apostles of discontent. If your beliefs differ from those of the fanatics of any faith the fanatics hold, of course, that you are utterly out of sympathy with true ideals. The knowledge possessed by most socialists and other liberals regarding the army, its ideals, its history, and the actions and thoughts of its members is about as vague as the knowledge possessed by most American citizens regarding the real facts of the every day life of King Tut.

Another choice bit follows:

"You, plain working men or business men who glance at this book, and think that college stupidity and corruption does not concern you, take this one fact and ponder it: millions of German and Austrian babies are hopelessly deformed by rickets, tens of millions of Russian peasants have perished of starvation, three hundred billions of human treasure and thirty million human lives were thrown away to no purpose—because, forty-five years ago, one student of Princeton College, Thomas Woodrow Wilson by name, was studying Hebrew, Greek and imbecile theology, when he should have been studying economics, geography, and social engineering!"

In the manner of the hero of the *Letters of a Rookie*, Mr. Sinclair might well exclaim, "Forceful! That's me all over, Mabel." Literal-minded readers of *The Goose Step* will probably be willing to concede that Mr. Upton

Sinclair is attempting to win the distinction of being our most intolerant liberal.

In his waggish way Mr. Sinclair hints several times in *The Goose Step* that the book and its author will not be properly appreciated for a hundred years or more. If it should attain sufficient contemporary fame to come to the notice of Messrs. Gallegher and Shean, those genial commentators on current topics may add a verse to their celebrated act, somewhat as follows:

"Mr. Gallegher!
Oh, Mr. Gallegher!
What's this Goose Step
That I hear about in town?
Stepping on the varsity
From Atlanta to the Sea,—
Who's this bird that
Knocks our learning ladders down?"

"Mr. Shean,
Why, Mr. She-an,
I think I know
The author that you mean.
Of the schools he makes great game
And he's fought his way to fame—"

"Jack Dempsey, Mr. Gallegher!"

"Upton Sinclair, Mr. Shean!"

MILES GLORIOSUS

JUDD, CHARLES H. and BUSWELL, GUY T. *Silent reading: A study of the various types.* (Supplementary Educational Monographs No. 23.) Chicago: The University of Chicago, 1922. 160 pp.

This is another of the series of reading studies by the "Chicago School." The monographs thus far devoted to this major investigation have fallen rather naturally into two groups. The first—those by W. S. Gray, C. T. Gray, and Schmidt—were brought to a close and in a sense summarized by Professor Judd in his *Reading: its nature and development.* Similarly the second group—those by W. S. Gray, Buswell, and Terry—are rounded out by the volume which now engages our attention.

As befits an interpretation, the treatment is less statistical than that of the immediately preceding volumes, less concerned with small details, and more devoted to broad meanings. Not that there is lack of a fact basis. Even if one does not like the conclusions, one must admit that the evidence is neither trivial nor meagre.

The central idea of the book is that there are manifold variations in the reading process—that reading is not just one general ability which may be turned to account for any purpose and upon any material, but rather that it is a group of specialized abilities. It is shown that changes in attention give rise to different kinds of reading. The reader attempts an adjustment to the expectation of answering questions, or of reproducing, or of paraphrasing. It is the author's belief that these adjustments are generally unintelligent;

and that if, for example, the school is going to hold over the student the expectation of questions, it ought to train him in meeting its demands.

But different types of reading material likewise give rise to different types of reading activity. In this connection the authors are evidently most interested in the reading of foreign languages. We judge this to be the case because of the enthusiasm and "go" with which they treat the subject. They show—evidence being taken from eye-movements—that even the best high-school students labor hard in the reading of French and that they do not read Latin at all. This is pretty serious. The authors, however, seem to preserve their equanimity. They apparently feel that they have "the goods" on the Latin teachers and enjoy the experience. We agree that their case is very strong; but we are sorry.

We agree, too, that in teaching Latin, reading is the proper major objective, that all other aims are secondary, and that most of them will not be attained in full measure unless reading ability has been acquired. What we shall now look forward to with interest is this: will Latin remain discredited as leaving the students only a "handful of ashes", or will its friends boldly accept the reading objective and contrive to attain it?

B. R. Buckingham

Ohio State University

News Items and Communications

This department will contain news items regarding research workers and their activities. It will also serve as a clearing house for more formal communications on similar topics, preferably of not more than five hundred words. These communications will be printed over the signatures of the authors. Address all correspondence concerning this department to Doctor E. J. Ashbaugh, Ohio State University, Columbus, Ohio.

The Bookshop for Boys and Girls (Boston) holds annually an exhibit of definite educational interest and value. The aim is to show such materials as illustrate the approach to school work through the project method.

The Department of Research, Attendance and Census, Wilmington, Delaware, under the directorship of Mr. E. C. Witham, seems to be doing a large amount of testing, having given this year more than thirty thousand tests to the children of the public schools. Variability in the accomplishment of children of the same grade in the same room, and between rooms of the same grade in different buildings, seems to be the outstanding result of the first testing.

The Ohio State Department of Education in cooperation with Doctor Ashbaugh of the Ohio State University has tested the students in the county-normal schools of that state. The battery of tests used included: Thorndike-McCall Reading Test, Buckingham Problem Test in Arithmetic, Kirby Language and Grammar, Barr American History, and Buckingham-Stevenson Information-Problem Test in Geography.

A survey committee appointed by the Montclair Home and School Council of Montclair, New Jersey, has presented a report on teachers' salaries with definite recommendations for salary schedules and suggestions for future policy. The report also attempts to show that the increases occasioned by the salary schedule proposed could be cared for on the basis of a less than one mill tax rate when the increases have reached their maximum. When home and school unite on such a recommendation it should not be difficult for the community to reach the right conclusion on the matter.

The teachers of the Commercial Department of the Toledo Public Schools under the supervision of Professor Runkel of the Department of Vocational Education, Ohio State University are making an occupational survey of the city. All persons between the ages of 16 and 30, who are engaged in com-

mercial pursuits in the city, will be included in the investigation. This survey will attempt not only to make a job analysis of each worker's task but will include data on the distribution of the workers as well.

Doctor Marvin F. Beeson, director of Cooperative Extension Service for Teachers in Western Colorado, for the University of Colorado, Colorado State Teachers College, and Western State College of Colorado, has accepted an appointment as director of education in San Diego State Teachers College of California. This position will coordinate and combine the Department of Education, the Training School, and the Department of Psychology and Measurements. During the summer session Doctor Beeson will be a member of the faculty of Ohio State University at Columbus, Ohio.

The preliminary standardization of a Latin Derivative Test, prepared by Doctor P. R. Stevenson and Mr. W. W. Coxe, is being carried forward by the Bureau of Educational Research, Ohio State University.

The form of this test resembles the arrangement used in the Stevenson Latin Vocabulary Test. The trial test which appears in the Directions is here given:

Column I	Column II	
1. *peto*	retain	( )
2. *tenco*	educate	( )
3. *educo*	admit	( )
4. *modus*	tenacity	( )
5. *mitto*		

The pupil is asked to find the Latin words in column I which form an important part of each successive English words in column II.

From the results obtained in this preliminary investigation the final form of the test will be determined. There are three forms of approximately the same difficulty, having the items arranged in increasing difficulty from the beginning to the end of each test form.

A mimeographed report has lately been issued by F. H. Duffy concerning the intelligence of the pupils in five of the ten elementary schools of Steubenville, Ohio. The graphical showing of the average intelligence quotients for each age group is especially interesting. The quotients do not begin to fall below 100 until after the thirteen-year group. Then they fall very rapidly. Another striking fact is that the percent of retardation according to mental age is appreciably greater than that according to chronological age—43 percent as against 35. Acceleration on the mental bases is also greater.

The Gregg Publishing Company has published a measuring scale for Gregg Shorthand Penmanship arranged by Elmer Hoke. It is on the general plan of the Ayres scale for handwriting except that values are at five- instead of ten-point intervals. This company has also published a measuring scale for knowledge of Gregg shorthand arranged by Mr. Hoke on the general scheme of the Ayres Spelling Scale. The scale consists of the Ayres One Thousand

Word List, and in addition five hundred commonest phrases derived from an investigation conducted by the author. The scale includes values from one hundred percent to six percent. A Prognostic Test of Stenographic Ability and a series of tests in Gregg shorthand have also been devised by the same author.

The Wisconsin State Department of Public Instruction has sent out the following battery of tests to be given to the students in the county normal schools, the high-school teacher-training departments, and the rural departments in state normal schools: Thorndike-McCall Reading Test, Buckingham Problem Test in Arithmetic, Leonard Test of Grammatical Correctness (A), and Sentence Recognition Test (H), Gregory-Spencer Geography Test, Otis Direction Test, and Nassau County Supplement for Composition. The first five are for the purpose of ascertaining to what extent the prospective teachers know the subjects they are expected to teach. The last represents an attempt to measure how well the teachers can do that which they are expected to do.

Doctor R. J. Leonard has recently been appointed to the staff of Teachers College, Columbia University, as Director of the School of Education, filling the vacancy caused by the resignation of Doctor Paul Monroe who has been appointed the Director of the International Institute of Education. Doctor Leonard has previously been connected with Indiana University and the University of California.

Doctor Monroe has associated with him Doctor W. F. Russell, formerly dean of the School of Education, State University of Iowa, who will act as associate director and Doctor L. M. Wilson, for the past year director general of education for Peru, and educational advisor to the minister of instruction, who will be in charge of the visitation of American schools by foreign students.

A second geography test, the Buckingham-Stevenson United States Information-Problem Test, is ready for final standardization. This test attempts to measure the pupil's general ability to solve geography problems which arise in concrete situations. The expense in connection with using this test is greater than the Place-Geography Test since it is necessary for each pupil to have a blank. The distinctive nature of this test will be shown best by quoting several problems as they appear in the test leaflet:

( ) 2. Which state raises the most rice?

1	2	3	4
Vermont	Louisiana	Oklahoma	Iowa

( ) 4. Which city has the coldest climate?

1	2	3	4
Milwaukee	Seattle	Cincinnati	Birmingham

( ) 10. WHY SHOULD FORESTS IN THE UNITED STATES BE CONSERVED?

1. They increase the supply of oxygen.
2. They make excellent places for hunting game.

3. They supply building materials and decrease danger of floods.
4. They enrich the soil and shade the ground.

( ) 13. WHY IS BIRMINGHAM BECOMING A RIVAL OF PITTSBURGH IN THE PRODUCTION OF STEEL?
1. Negro labor in the South is inexpensive.
2. Birmingham is situated in a region rich in coal and iron.
3. There is a great demand for steel in Alabama.
4. Manufacturing is becoming extensive in the South.

The Bureau of Educational Research of Ohio State University has recently completed school building surveys of two Ohio cities—Mansfield and Marietta. These surveys have been made under the direction of Doctor P. R. Stevenson who has been assisted by other members of the university faculty and several graduate students.

Each of these surveys has included (1) the scoring of the existing school plants by means of the Strayer-Englehardt Score Card; (2) studies of the trends of population which have included not only the preparation of maps showing the distribution of birth certificates during the past five years and the distribution of elementary, junior high-school, and senior high-school pupils during that time, but also the preparation of maps showing the building permits issued; and (3) an inquiry into the financial condition of the city.

Those who are not familiar with the new extension and revision of the Douglas Algebra Tests will be interested in securing samples of them. They are published by the Bureau of Educational Research of the University of Oregon, Eugene, Oregon. There are two series, A and B, each with two forms intended to be equivalent. Series A deals with the fundamental operations and simple equations. Series B exhibits the remaining topics of the usual course in elementary algebra. We note the fact that the material in these tests conforms closely to the subject matter which pupils are taught. The topics are very close to the recent recommendations of the National Committee on Mathematics Requirements.

In a letter which we received last month from Doctor Garry C. Myers an interesting report on the Cleveland Educational Research Club is made. Doctor Myers says: "Our Cleveland Educational Research Club is certainly thriving. Our members are interested and we have much good material from which to recruit our ranks. Our public meeting was a success and we have had two good papers in research at each regular monthly meeting. We had a dinner meeting, with two papers by members, at the Cleveland Hotel on April 20. We shall soon have to divide into special groups but we do not want to expand at the expense of quality. We have more papers ready now than we can provide a hearing for."

With further reference to acceleration, we learn from Principal E. A. Ross of St. James, Manitoba, that in that city it is customary to select in June of each year at least one class of the sixth grade for advancement directly to the eighth grade. The next year the pupils thus selected do the work

of the seventh and eighth grades. A similar plan is proposed by Professor C. S. Van Deusen of the Kent (Ohio) State Normal College, who suggests that from ten to twenty-five percent of the seventh-grade pupils be selected in June for all-around ability (not by Phi Beta Kappa methods); and that these pupils be told they may enter the ninth grade in the fall on probation, provided they read certain books or do specified tasks during the summer.

The Dayton (Ohio) Board of Education has passed a general rule which states that promotion of teachers, supervisors, principals, and all assistant and special teachers shall be only upon *merit*. Merit shall be understood to mean (1) successful experience; (2) growth in the profession as indicated by attendance at summer schools, educational travel in this country or abroad, extension work, correspondence work, participation in activities outside of the regular school work; and (3) the ability at any time to pass a physical examination given by one of the doctors employed by the board of education. A notation under (3) states that, while all new appointees must meet this requirement, physical fitness alone does not entitle any one to reappointment or to increase in salary. The salary schedule in all teaching positions follows the general rule of fifty dollars annual increase during the probationer's period of two or three years, and one hundred dollars annual increment thereafter for a limited length of time.

Scales for rating teachers in service still seem to appear in spite of the difficulties which many superintendents have had through attempting to use them. One of the latest to come to our attention is by Mr. John W. Kratzer of Wallingford, Connecticut. The scale has some subheadings under each of the five major items: teacher's personal equipment, teacher's professional efficiency, teaching efficiency, pupil reaction, and care of the classroom. The subheads number 25, and the marking scale is on the basis of four points for superior; 3 points, good; 2, fair; and 1, poor. A perfect rating is, therefore, 100 points. The author states that acceptable teachers should obtain a rating of at least 75 points. A large number of questions under each of the subheads attempts to make these headings more definite in the minds of the persons using the scale.

There has recently been organized a Minnesota society for the study of education with Doctor M. E. Haggerty, dean of the College of Education, University of Minnesota, as president; R. B. MacLean of the State Department of Education, as vice-president; and Doctor L. J. Brueckner, professor of education, University of Minnesota, as secretary-treasurer. The society has already started work on a preliminary survey of research work. A questionnaire has been sent to the members of the society asking information on studies completed, under way, or desirable; and those which although not undertaken are desirable and in which the contributor would like to cooperate. For convenience in reporting, members are asked to indicate studies under general types of administration, instructional research, tests and meas-

urements, and special research. This society is similar in its organization and purposes to various state and sectional educational research associations. The JOURNAL is glad to extend congratulations to the State of Minnesota on the advent of this new research agency.

The Public School Publishing Company announces the publication of a table for converting the scores made on ten different achievement tests, which include reading, spelling, arithmetic, and geography, into B scores by the use of the B-score table. The individual scores on each of these tests can be translated into B scores which are the grade equivalents of the test scores on the scale of grade standards for the test. This is perhaps the best means yet devised to show teachers and parents the degrees through which a given child has progressed in his educational work through the elementary grade. For example, if John Jones has a B score of 6.0 in fundamental operation in arithmetic, it means that his achievement is equal to that of a typical beginning sixth-grade pupil. If, at the same time, his B score on the spelling test is 4.0, it indicates that his achievement in spelling is two grades below that of his achievement in arithmetic. These scores can be easily translated into meaningful terms for the average parent.

Moorhead State Teachers College (Minnesota) has tabulated certain data concerning the professional experience of the 115 seniors now on the tentative list for graduation for June and July. Of these students, 49 percent have had one year or more of experience in teaching in the public schools previous to this year, including fifteen percent who have had one year's experience only. The distribution of previous experience is as follows:

PREVIOUS EXPERIENCE OF 115 STATE TEACHERS COLLEGE GRADUATES

Years of Experience	Frequency
1	17
2	10
3	11
4	10
5	3
6	3
7	2
8	0
9	0
10	0
11	1
Total	57

The unique value of teacher-training activities after some experience in actual teaching in the public schools is quite apparent. The fact that one-half of this group have been pursuing the course in teacher training with this background makes them more valuable at once to superintendents and boards of education.

The second annual Pacific Coast Conference on Educational Research and Guidance was held at the San Jose State Teachers College on April 20 and 21. Doctor B. R. Buckingham, director of Educational Research at Ohio State University, was the principal speaker from outside the state. He presented several papers of unusual merit and value.

The addresses during the two days were stimulating and profitable. Papers were presented by Doctor Ellwood P. Cubberley, Department of Education, Stanford University; Doctor J. Harold Williams, Director of Research, Whittier State School; Miss Elsie Martens, Assistant in Educational Research, University of California; Doctor C. E. Rugh, Department of Education, University of California; Doctor T. L. Kelley, Department of Education, Stanford University; Doctor Raymond Franzen, Department of Education, University of California; Doctor John C. Almack, Department of Education, Stanford University; Mrs. Grace C. Stanley, State Commissioner of Elementary Education; Doctor Margaret Alltucker, counsellor, Berkeley High School. Doctor Virgil E. Dickson, director of Research and Guidance, Oakland and Berkeley City Schools, was re-elected president for the ensuing year.

The University of Iowa Extension Bulletin, Number 88, April, 1923, prepared by Don C. Rogers, is entitled the *Trend of Teachers' Salaries*. The bulletin presents in both tabular and graphical form the central tendency of salaries for superintendents, high-school principals, and high-school and grade pupils, for the years 1913-14 to 1922-23, inclusive. Reliability of the data is established by the fact that thousands of teachers' salaries are included for each year, and from 60 to 85 percent of the total number of Iowa towns are represented yearly. When the salaries of teachers of the World War period and the Civil War period are compared, it is evident that at the beginning of the World War teachers were much better off and made more rapid and greater salary gains than the teachers in earlier days. Iowa salaries for 1913-14 to 1921-22 showed the following increases: superintendents, 131 percent; high-school principals, 90 percent; high-school teachers, 112 percent. The year of greatest salary increases for all classes was 1920-21. The year 1921-22 was definitely the breaking point, the peak from which the curve of salary trend began to turn downward. The salaries of 1922-23 are slightly lower than those of the preceding year.

The schools of Providence, R. I., have been engaged in recent years in a very definite effort to advertise the high school to the pupils who frequently drop out of school as soon as the compulsory law will permit. For the purpose of creating interest in the continuance of education the general methods employed in commercial advertising have been used. An intensive campaign of advertising was carried on as a group project by the principals of the grammar schools, the teachers of the graduating classes, and the department of educational and vocational guidance, with the assistance of an advisory committee of the Town Criers, a group of professional advertising experts. A

number of striking advertisements were written upon the blackboard or placed in printed form upon the walls one at a time, and the teachers thoroughly discussed with their pupils the points set forth. Some 60 pages of this advertising matter together with suggestions to the teachers for the use of this material have recently been received by the editor of this department. It is possible that this material could be secured by school people through guarantee to use it in their own communities.

An interesting report on "Alleged 'Fads and Frills' in the Public School Curricula" is reported in the March number of the *Education Bulletin*, published by the Department of Public Instruction of the State of New Jersey. At the request of the state commissioner of education, county and city superintendents made diligent inquiry to obtain from the leading citizens and patrons of the schools an opinion regarding what "Fads and Frills" were now included in the school program. The report sent in voiced the opinion of almost three thousand people of whom more than twenty-six hundred were satisfied with the present curriculum, or were non-committal about it. Of the 389 who recommended omissions 123 would omit or modify physical training in the rural schools; 31 would omit or modify music; 28 would omit or modify manual training; 20 would omit cooking; 16, sewing; 7, physiology and hygiene; 6, drawing; 6 would abolish dental clinics; 5 would abolish medical inspection; 5 would abolish civic instruction in the grades; 4, nature study; 3 would omit Latin, French, Spanish, and algebra from the high school; and 2 would omit ancient history. The conclusion reached was that nearly every subject taught in the schools had some opponent, but that the proposition that the public generally holds a definite group of school activities to be "fads and frills" is a myth.

The Buffalo High Schools, the People's College is the title of a most interesting booklet published for the purpose of more fully acquainting the public with the outstanding facts and accomplishments of these schools. It is a type of publicity which the high-school people or the board of education in any city would do well to distribute. It is a sixteen-page booklet each page of which is illustrated with pictures of buildings or class activities. The descriptive matter is written in a way which will make its appeal to both the adolescent and the adult mind. The following quotation is worthy of being passed on and used by school people everywhere:

Do you know that in no other country in the world do all the children of all the people have an equal chance to go to such schools as are described in this booklet? That, although a new high-school building has been completed somewhere in the United States every day of every year for the past twenty-eight years, it has been impossible to build high-schools fast enough to care for the army of young people who are demanding a high-school education? That when the great World War broke out in 1914 there were more boys and girls in the high schools of the United States than there were in similar schools in all of the rest of the world put together? That within the last seven years, the enrollment in the high schools of this country has very nearly doubled?

Objective Examination on Intelligence Testing

The Objective Examination on Intelligence Testing which was sent out last summer for preliminary standardization brought in scores from classes enrolling about 500 students, which allows the announcement of the following tentative norms:

SCORES GIVEN BY PERCENTILE RANK

Test	Percentile Rank								
	10	20	30	40	50	60	70	80	90
Multiple-Answer	30	33	36	38	40	42	44	47	50
True-False	26	34	40	46	50	54	58	62	70

The median scores in the five highest institutions having classes of twenty or more—the Universities of Chicago and Minnesota, the Chicago Normal College, the State Normal School at Buffalo, and the University of Michigan—were 42 for the multiple-answer type and 55 for the true-false type.

The multiple-answer or recognition form of the examination has now been revised by the omission of statements shown by the statistical returns and requested criticisms to be too hard or too easy or debatable or of minor importance, and by supplying a larger number of possible answers in certain cases in order to reduce the effect of guessing. It correlates with average scholarship of previous semester at 0.51, which is about the same as the correlation between the semester marks themselves. Experiments in which both the earlier and the revised forms are given to the same classes, in one case the earlier form first and in the other the revised form first, show that the norms of the earlier form apply to the revised form without change. The new edition can be secured from the Plymouth Press of Chicago.

A surprising uniformity among institutions was revealed by this test. When the percent of the class missing each question in one university is subtracted from the percent which misses the corresponding question in another institution, half the remainders are less than ten, and nine-tenths are less than thirty. Assuming that the answers cannot be supplied from general information or by guessing (especially in the recognition type), this would seem to show great similarity in the distribution of emphasis among different topics in the courses now being given on intelligence testing.

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An Extreme Case of Mis-Measurement

In the *Journal of Educational Psychology* for April, 1922, Miss Margaret V. Cobb writes, (1) "In any measurement of mental age made by means of a scale whose units are relatively large . . . there is . . . an error due to the fact that the scale proceeds by steps instead of being continuous." The purpose of this article is to present a case of mismeasurement in which the error can be traced to this source.

The examinee M., one of a group of 116 twelve-year-old children examined by Mrs. Marjorie H. Wilner in connection with a comparative study of the Stanford and Herring Revisions of the Binet-Simon Tests, was given the Stanford on March 14, 1922. Her chronological age was then 12 years and 3 months. The examination resulted as shown below:

YEAR XII. (8 tests, 3 months each)

+ 1. Vocabulary, both lists. Score, 46.
— 2. Abstract words.
a, +; b, —; c, —; d, —; e, —.
+ 3. Ball and field. (Superior plan.) +.
+ 4. Dissected sentences.
a, +; b, +.
+ 5. Fables.
a, —; b, 2; c, 1; d, 2; e, 2.
+ 6. Repeats 5 digits backwards.
3-1-8-7-9, +; 6-0-4-8-2, —; 5-2-9-6-1, —.
+ 7. Pictures, interpretation.
a, +; b, +; c, +.
+ 8. Gives similarities, three things.
a, +; b, +; c, +.

YEAR XIV. (6 tests, 4 months each)

— 1. Vocabulary, both lists. Score, 46.
— 2. Induction test.
1, +; 2, +; 3, +; 4, +; 5, —; 6, —.
— 3. President and king.
(Power, +; accession, —; tenure, —.)
+ 4. Problems of fact.
a, +; b, +.
+ 5. Arithmetical reasoning.
a, +; b, +.
+ 6. Clock.
6.22, —; 8:10, +; 2.46, +.

YEAR XVI, AVERAGE ADULT. (6 tests, 5 months each)

— 1. Vocabulary, both lists. Score, 46.
— 2. Interpretation of fables.
a, —; b, 2; c, 1; d, 2; e, 2.
— 3. Difference between abstract words.
a, +; b, —; c, —; d, —.
— 4. Problem of the enclosed boxes.
a, —; b, —; c, —; d, —.
+ 5. Repeats 6 digits backwards.
4-7-1-9-5-2, —; 5-8-3-2-9-4, +.
— 6. Code, writes
Errors, 3; Time, 6 min.

All elements on the eighteen-year level were scored minus.

M's mental age according to this examination was 158 months, her I.Q., 107. Two months later, May 13, 1922, the same examiner administered Group E of the Herring Revision. The resulting M.A. was 187 months, I.Q., 126. The greatest Stanford-Herring difference found among the other 115 individuals in the group examined was 8 points in I.Q.; and even the 154 cases examined while the Herring was still in the experimental stage showed no difference greater than 13 points. Both examinations were therefore sub-

jected to a careful study in an attempt to locate the source of the discrepancy. Miss Cobb's article suggested the kind of error to be sought, and the following facts concerning the Stanford were soon found:

1. M. had a score of 7 points in the fables. A score of 8 points would have given her credit for this test on the sixteen-year level.
2. The code test was completed in 6 minutes with 3 errors. One less error would have resulted in credit for this test.
3. In the induction test, the first four of the six foldings resulted in plus scores.
4. The vocabulary score was 46. A score of only 40 was necessary for the twelve year level; a score of 50 would have resulted in credit on the fourteen year level.

These facts made it seem at least possible that the mismeasurement was due to an error of the type described by Miss Cobb, so it was determined to remeasure M. with the Stanford. This was done September 12, 1922, six months after the first Stanford. The mental age obtained was 196 months, the I.Q., 128.

TABLE I. THE RESULTS OF THE THREE EXAMINATIONS

Date	Examination	C. A.	M. A.	I. Q.
March 14	Stanford	147	158	107
May 13	Herring	149	187	126
September 12	Stanford	153	196	128

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Educational Research Association

(HARRY A. GREENE, *Secretary and Editor*)

The election of a large number of new members each year and the many changes in addresses on the part of the older members combine to make it advisable to prepare a new and complete list of members in good standing at this time. The contribution to this department for this number comprises such a list complete and accurate as far as it is possible for the secretary to make it. Information leading to the correction of errors in this list will be appreciated.

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